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Part 1.

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Journal of the Department of Agriculture



WESTERN AUSTRALIA

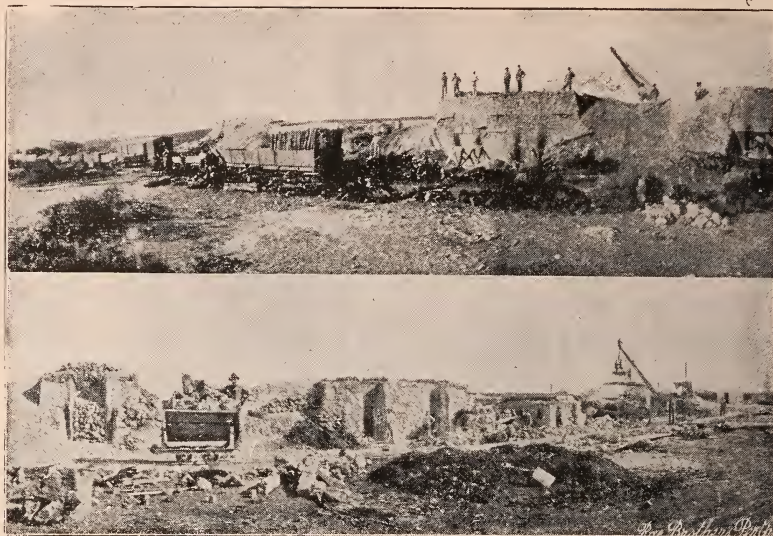
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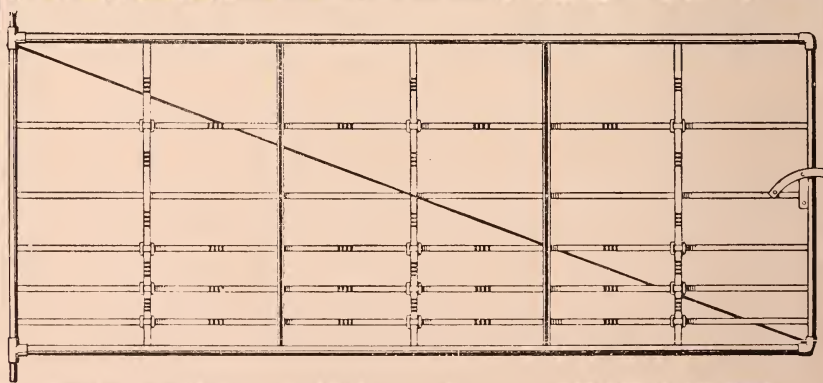
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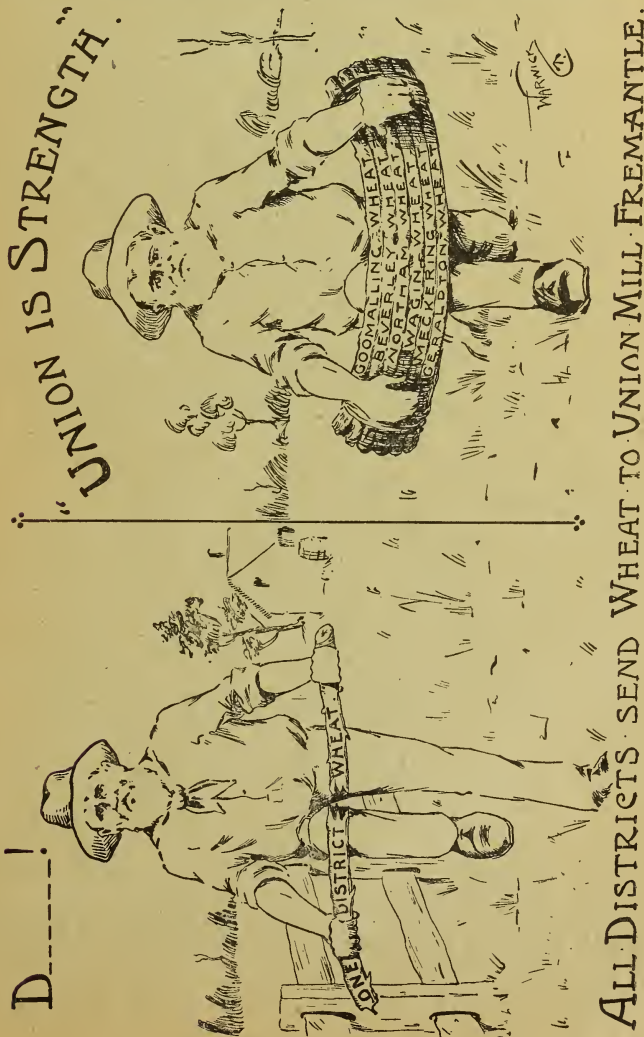
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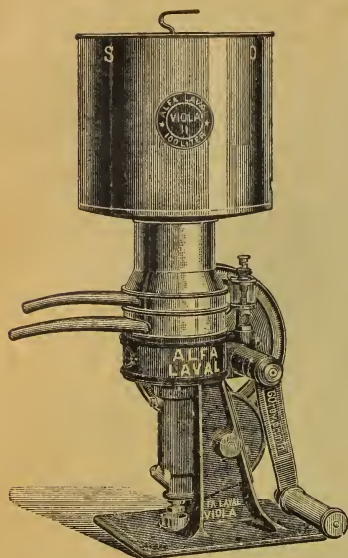
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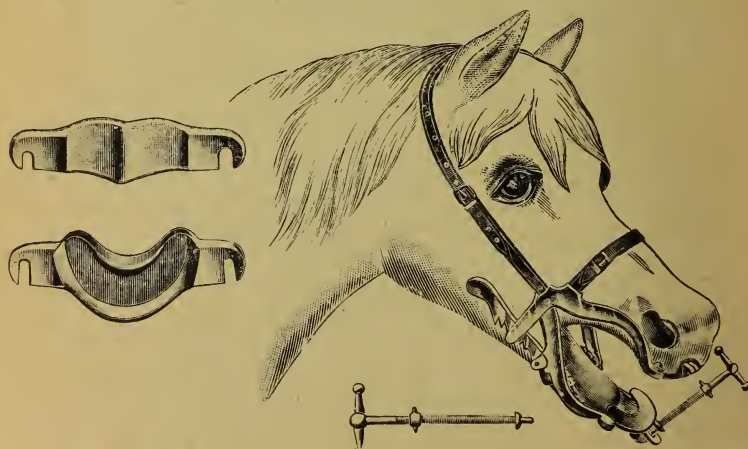
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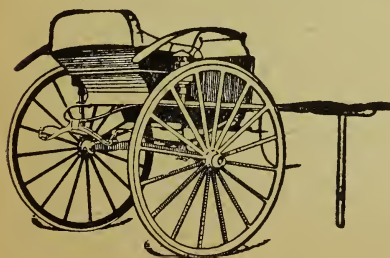
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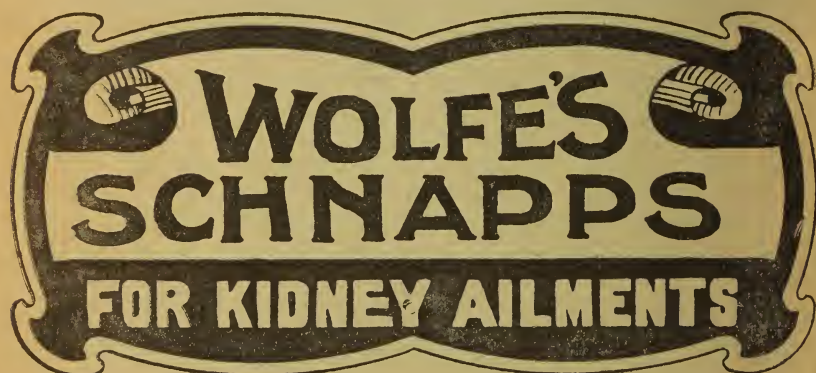
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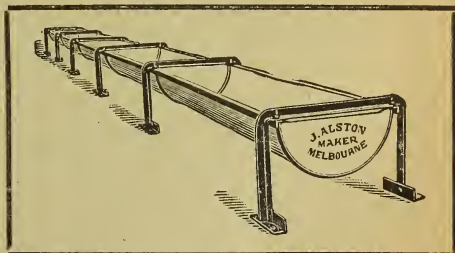
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JOURNAL
OF THE
Department of Agriculture
OF
WESTERN AUSTRALIA.

Vol. XVIII.

JANUARY, 1909.

Part I.

NOTES.

— — — — —

Removing Potato Flowers.—It has been recently proved by experiment, says the *Australian Agriculturist*, that by removing the flowers from the maturing potato crop the effect was to increase the weight of the tubers from 10 to 25 per cent.

— — — — —

Season's Greetings.—We have to acknowledge, with reciprocal feelings, the receipt of Christmas and New Year cards from the Departments of Agriculture of New Zealand and New South Wales conveying the "best wishes" of the sister State and Dominion respectively.

— — — — —

State Farm Pigs for Sale.—Pig-breeders in want of pure bred stock can purchase some Large Black, Berkshire, and Middle Yorkshire, and young which the Department has for sale at the State Farms. Particulars and prices can be obtained on application to the respective managers.

— — — — —

Bedfordale Annual Show.—The Annual Chrysanthemum and Fruit Show of the Bedfordale Agricultural and Horticultural Society will take place on April 17. The prize list this year is a liberal one, and should be the means of bringing a large number of competitors and entries.

— — — — —

Castor Oil Plants as Green Manuring.—Experiments made in Barbados with castor oil plants for green dressing purposes, show that the total weight of the crop per acre was 6,655lbs., containing 2,323lbs. (34.91 per cent.) of organic or humus-forming material. The amount of nitrogen added to the surface of the soil by the crop is shown to be 33.3lbs. per acre, of phosphoric anhydride 21.3lbs., and of potash 53.2lbs. per acre.

Fruit Cultivation in Great Britain.—Although the British importation of fruit has developed so largely, it is interesting to note that there has been a striking increase in the home cultivation of such fruits as are capable of production in the United Kingdom, and according to figures which have been recently published the acreage of orchards has increased from 14,221 in 1873 to 250,176 in 1907. Of these latter, no less than 244,118 are located in England, and over 172,000 are devoted to the cultivation of apples. The 64,792 acreage of small fruits in 1897 had increased to 82,175 acres in 1907.

Namban Creek Phosphates.—Twenty tons of phosphates from the cave deposits discovered recently by Mr. C. Goezel, geologist to the Department, at Namban Creek have been transported by sea and distributed to the Brunswick and Hamel State farms, and also amongst others who will make trials of the fertiliser. The results of these experiments will be made known and the value of the phosphate compared with that of other familiar fertilisers. Mr. Goezel is exploring the country in a southerly direction towards Fremantle, and has located a continuation of the deposits and cave formation.

Wheat on the Eastern Goldfields.—In his report of his visit to the Eastern Goldfields in July last, the Under Secretary of the Department referred to promising fields of wheat seen at Kalgoorlie, Coolgardie, and Kanowna. Messrs. Bow Bros., of Coolgardie, had a fine lot of 80 acres under cultivation, which the firm regarded with so much encouragement after several years of local experience that they took up an extended lease, and prepared the land by cleaning and fallowing. The Department now learns that Messrs. Bow Bros. have no less than 350 acres ready for sowing with early wheats in March. Their enterprise will be followed with general interest and wishes for the success it deserves.

Sunlight Soap for Spraying.—A New South Wales orchardist speaks in high terms of the efficacy of Sunlight soap for diseases of fruit trees, especially for scale. He says: "One tablet of Sunlight soap should be sliced up into two gallons of water, and boiled until the soap is dissolved, and when nearly cold spray on the trees in the afternoon when the sun is not too hot. For peach aphides (which come on the trees when they are in blossom, and eat all the flowers) I make the solution stronger, by adding two tablespoonfuls of Lever's dry soap (Sunbeam washing powder) to every four gallons of the above spray, and I spray the trees just before the buds burst. It will also kill aphides on rose trees, cabbages, and swede turnips. It is a sure cure for San Jose scale."

Cow Peas on Sandy Soil.—Cow peas should be sown on dry, sandy soil not suitable for other crops. It has the double advantage of turning poor soils to account and of improving them; being a climber, it will be all the better for being sown with some maize, which will keep the pea from the soil by furnishing a support; and when the cow pea is used for silage the maize will add to its value. The peas should have room; there is no gain in overcrowding. Seeds 6 inches to 8 inches apart and in rows 3 feet apart. This will take from 7 to 10lb. of seed per acre. If using the small maize drill, set the plate to the $\frac{3}{8}$ in. hole. Gypsum $\frac{1}{2}$ ton, or superphosphates $1\frac{1}{2}$ to 3cwt.



CULTIVATION IN BARE SAND.

Fruit and kitchen garden next to Supreme Court, Esplanade, Perth.

to the acre would be good. The ploughing-in of the stubble after the peas have been cut or fed off, will add some nitrogen to the soil.

Unit Value of Thomas' Phosphate.—Since the publication of unit values of fertilisers in the April number of the *Journal*, the Government Analyst has found it necessary to correct that given to Thomas's phosphate, viz., 3s. 6d. based on a 14½ per cent. of phosphoric acid, and the low price of £2 9s. per ton, according to data at that time. On that basis a Thomas's phosphate containing 17 per cent. phosphoric acid would only be worth £3 per ton, whereas existing quotations are from £3 15s. to £4 per ton. As this forms an important consideration, it is deemed advisable to withdraw the Thomas's phosphate from the list of unit values until the next season, when probably 4s. 6d. or 4s. 9d. would be found a more correct unit value. At that price the fertiliser is an expensive one when compared with superphosphates, Abrolhos guano and other phosphate fertilisers on the market.

Gardening in bare sand.—It is remarkable what can be done with a patch of barren-looking sand, with work and perseverance, aided with a little soil stimulant. No better evidence of this can be found than in the enclosure at the side of the Supreme Court buildings, facing the Esplanade. This piece of ground, originally white sand, has been converted by Mr. S. Myslis, the caretaker, in the course of some six years into a veritable oasis. The two illustrations opposite afford evidence of this. The vines of the muscatel variety are vigorous, wide-spreading, and bear splendid bunches of fruit in abundance. Mr. Myslis has been equally successful with passion-fruit, peaches and apples, and of vegetables he has obtained every year good crops of tomatoes, cucumbers, pumpkins, potatoes, etc. He has used no other fertiliser than occasional supplies of stable manure. The garden is a credit to his industry.

A New Fibre.—There has recently been on view at Dalgety & Co.'s premises in Sydney samples of materials made from a marine fibre mixed with wool. This fibre grows between Jarrold Point and Port Broughton, Spencer Gulf, South Australia, in tufts like grass from the water's edge outward to a great depth. Syndicates have obtained leases of areas of the shore, and the exhibition was arranged by the Fibrous Deposit Company Proprietary, Ltd. The raw material is not inflammable, as it will only smoulder when a match is applied, and has therefore an advantage over cotton, than which, it is also claimed, it is cheaper. Fabric for coarse blankets, dress lengths, and the like, made at the Williamstown mills, were shown. The wearing and hygienic qualities of the new material remain to be shown, and if these are satisfactory it would seem that an important commercial asset has been exploited.

The Fruit Fly.—The Department's orchard inspectors report that the fruit fly is now evident in the fruit displayed at auction. Parasites introduced by Mr. Compere, the Entomologist, are being rapidly bred at the laboratory in order to release them in colonies in orchards known to be infected. In orchards where the pest is just putting in an appearance the practice found successful during the last two seasons of trapping by means of kerosene in a

tin attached to a pole, placed among the branches of the trees or tacked to a branch, is recommended. Bright tin only should be used, and put in such a position that the light will attract the pest. Kerosene has a singular attraction for fruit flies, and those who have used it in the manner described report the destruction of large numbers of the insects. Growers should not neglect to clear from the ground all fallen fruit, and dispose of it by deep burial or burning or boiling.

Australian Fruit-trees for East Africa.—Orchardists and nurserymen should make a note of the following letter received by the Department from the Lakes Trading Company at Nairobi in British East Africa. There appears to be a good field offering in that portion of the Empire for an export trade in suitable fruit trees from this State, whose geographical position is an advantage in its favour:—"We should esteem it a favour if you would put us into communication with growers of fruit trees. Some eight years ago we saw Australian fruit trees imported into South Africa with great success, and if they could be as successfully got here we could do an enormous trade. Do you know any firm in your State who would care to experiment by sending a small number to test how they would stand the journey? It would be better if they (the trees) are not less than 6ft. long. There is truly a gigantic opening in this line here; at present the supply comes from South Africa, but it is dear and unsatisfactory."

Economical Fencing.—Every man who goes on the land with the intention of staying there gives early thought to putting up ring and subdividing fences. These he wishes to have as substantial as possible with equal economy in cost. Messrs. Malloch Bros., of 47 King Street, Perth, who will be found among our advertisers, claim that the best principle on which to erect sheep and cattle proof fences is with two or four posts to the chain, and that the most satisfactory materials for this class of fence will be found in the "Neptune Unrivalled" patent galvanised steel fencing wire, with Page's "Simple Droppers." This wire does not sag, and owing to its high elastic limit does not snap in frosty weather nor when cattle run into it. The droppers, which are made of 1in. hoop steel, distribute the strain over all the wires; they are manufactured in Perth by Messrs. Malloch Bros. These materials combined make stronger and more springy fences than the old style with posts 10ft. apart, with all the advantages of American woven-wire fences without their disadvantages and high cost. Fuller particulars can be obtained by writing to the firm, or visiting their show-rooms.

Fruit Cultivation on Darling Ranges.—The adaptability of the elevated and temperate slopes on the Darling Ranges for orchard industries is receiving increasing demonstrations of success in growers of fruit of more recent date. There are besides the ready accessibility to the chief market of the State and facilities for transport to add encouragement to those who enter upon the cultivation of suitable fruits. Among those who have established an orchard in the hills is Mr. Thos. Wilkins, of Stoneleigh, near Lion Mill, at Parker-ville. His orchard was planted four years ago and is situated on a very favourable slope with good aspect, and where beautiful spring water is obtained from both bore and well. Sixteen hundred trees have been planted,

the varieties of which include apples, pears, peaches, apricots, plums, cherries, and nectarines, besides varieties of Japanese plums. Mr. Wilkins speaks very highly of the latter, particularly Burbanks and Kelsie, finding them very early bearers and prolific producers. Evidence of this was seen in some small branches taken from trees which Mr. Wilkins brought for inspection; they were thickly clustered with healthy half-grown fruit, giving promise of abundant yield.

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The Back Settlers' House.—A contributor in the South Australian "Journal of Agriculture" writing on the erection of comfortable houses by pioneer settlers, says:—"In the thinly-rolled sheets of 'fibro-cement' which have recently come into the market, I think there lies the solution of the problem of how to reduce to a minimum the discomforts of life in the makeshift house of the back blocks, and in case our settlers have not heard of it before I wish to tell them what it is and how it is used. Fibro-cement is rolled out in thin sheets in two sizes, the larger 8 x 4 feet, and the smaller 4 x 4 feet; the sheets are of two thicknesses, $\frac{3}{8}$ inch and 3-16 inch, and the price is 4s. 9d. per yard for the thicker, and 2s. 9d. for the thinner. The sheets are hard and tough, not easily broken, can be cut with the saw or chisel, can be planed and nailed like any ordinary piece of wood, but with the great difference that they never split in nailing. The greatest advantage of all is that fibro-cement is a non-conductor of heat and cold, and is fire-proof. With all these qualities it will be patent to settlers that in this material they have a much better friend than the galvanised iron or weather-boards which have hitherto provided their handiest and cheapest means for house-building. I can confidently recommend it as a material which should be invaluable to those who cannot build with brick or stone."

REPORT OF THE ROYAL COMMISSION ON THE MEAT INDUSTRY.

(Presented to the Legislative Assembly, Friday, December 18, 1908.)

The report of the Royal Commission appointed to inquire generally into questions affecting the meat trade in the State was presented to His Excellency the Governor and laid on the Table of the Legislative Assembly on the 18th December last. The Commission consisted of Mr. R. W. Pennefather, M.L.C. (chairman), Captain R. Laurie, M.L.C., and Messrs. Daglish, Johnson, and Gordon, M's.L.A. The scope of the Commission was to inquire into and report upon :—

- (1.) The available supplies of meat on the stations and farms of Western Australia.

- (2.) The facilities for transport to market in the metropolitan and goldfields areas and the other more closely-peopled centres of the State.
- (3.) The facilities now available for slaughter and cold storage, tinning and other treatment, and for the sale of meat at the principal centres.
- (4.) The means employed in connection with the distribution of meat by the retail tradesmen.
- (5.) The methods employed in the other States of the Commonwealth, with a view to the adaptability of those methods to the conditions existing in this State were found satisfactory.
- (6.) The alleged refusal of wholesale sellers to supply certain retail sellers alleged to have sold under fixed prices.
- (7.) And generally into the methods which being adopted may reasonably be expected to lead to a reduction of the prices of meat to the consumer.

The report is as follows:—

Your Commissioners have held sixty-five meetings and examined one hundred witnesses at Perth, Northam, and Kalgoorlie. They have also witnessed the debarkation of a cargo of cattle from Kimberley, and have inspected the abattoirs at Robb's Jetty, a proposed abattoir site at North Fremantle, the Government Refrigerating Works at Perth, and Kalgoorlie abattoirs.

REFERENCE (1).

The available supplies of meat on the stations and farms of Western Australia.

The latest official returns showed the live-stock of the State on December 31, 1907, to be as follows :—Cattle, excluding dairy stock and those under one year old, number 601,364 ; sheep, 3,694,852 ; pigs, 53,122. It is fair to assume, from evidence adduced, that the proportion of cattle fit for slaughter in the State approximates ten per cent. of the whole number. Applying the mean average consumption of meat per head of population as estimated by statisticians and experts to be one head of cattle per five head of population per annum, it would seem that the consumption of beef is about equal to the number of marketable cattle available. The evidence, however, in connection with East Kimberley cattle shows that only five per cent. of the herds are suitable to be sent to market, and it would thus appear that there is a large margin left there which could be operated upon. Indeed, it has been shown that a considerable percentage of cattle unsuitable for shipment which could be commercially handled within the district, are cumbering those pastures and dying of old age for lack of local facilities for treatment. Various suggestions have been made for the utilisation of such stock, which would form a valuable asset economically treated. The processes of freezing, chilling, and canning have all been advocated in connection with what should be a marketable proportion of the surplus stock of the northern pastures. This aspect is considered at length in the answer to Reference (3).

The flocks and herds have augmented very rapidly within the last few years, and with the increasing attention given to mixed farming there is every reason to anticipate that this progress will in future be more marked.

The production of beef already suffices for local requirements, but during a certain portion of the year it is necessary to import supplies of frozen mutton, by reason of the high price demanded by local producers, who prefer to hold their sheep until after shearing. Immediately after shearing, in consequence of the desire of producers to dispose of their surplus, there is a glut in the supply of mutton from which, under the present conditions of the wholesale butchering trade, the consumer reaps no advantage.

There is a scarcity in the supply of pork to a regrettable diminution in the number of pigs, which in the last two years has fallen from 74,567 to 53,122. But this reduction may be attributed to the fact that farmers find it more profitable to grow grain for market than to utilise their wheat to feed pigs.

REFERENCE (2).

The facilities for transport to market in the metropolitan and goldfields areas and the other more closely peopled centres of the State.

Into the question of the facilities for transport to market of stock destined for the metropolitan areas and other large centres of population, several important elements necessarily enter.

One of the most serious disabilities under which the cattle industry suffers is the vast distance between the pastures whence the cattle are drawn and the centres of population in which they are marketed. In addition to the distance from markets, there is the still greater disadvantage under which the trade suffers in the mode of transport. No other State of the Commonwealth is similarly hampered. The pastures of the Eastern States are, from an economic point of view, much better situated in relation to the centres of population. For although stock, especially cattle, are overlanded at times from the Northern portions of Queensland to the capital cities of the other States, and traverse vast distances on the way to market, yet feed and water are so abundant that they not only lose little, but often improve in condition. The disadvantages of sea-borne travel, with the inevitable accompaniment of wastage, are unknown on the Eastern side of the continent. In the Kimberleys, cattle are travelled on the hoof long distances to the port, before the voyage with its suffering and risk is undertaken. Although the cattle boats are equipped at considerable expense for the conveyance of stock, it is impossible to eliminate the risk or prevent the suffering and waste incidental to each voyage. Improvement in the conditions of transport by sea may be expected upon the advent of three new steamers, which are being built for the North-West trade. The shipping facilities at the various ports are sufficient to cope with the present trade.

The evidence indicates that there has been no combination in respect of freights between the large pastoralists of the North and the shipping companies to the detriment of the smaller pastoralists, and that freights charged for cattle voyaging down our coast are much lower than those ruling over similar distances between the Eastern States and Western Australia.

Following upon the difficulty and expense of shipment from the North, the tick regulations have a further tendency to increase the cost of meat to the consumer. There is a large area of good pastoral country upon the tablelands within the tick area of East Kimberley, a portion of which is known to be clean, the remainder only slightly ticked, and where conditions are such

that it appears tick will never be a serious menace. Under the present system cattle from this area can only be shipped to market from the port of Wyndham. In order to reach the port they are compelled to traverse a region known to be tick-infested, wherein they are subjected to and frequently contract tick fever. Heavy mortality results from this practice, which has been described as "cruel and inhuman."

It has been admitted by the Chief Inspector of Stock and other witnesses that the proclaimed tick area embraces a large tract of country which is immune. Cattle from the "clean" area referred to, which includes all that land from the Southern boundary of the proclaimed tick area North to the 18th parallel of latitude and West to the 127th degree of longitude may be travelled with safety to the port of Derby. But in order to eliminate all possibility of risk of conveying tick to West Kimberley, your Commissioners recommend that the precaution of dipping shall be adopted before such cattle pass the present tick boundaries.

At the present time, vessels taking in cattle at Wyndham are not allowed to ship stock from other ports on the coast. This embargo should be removed, as it appears from the evidence that tick are not directly communicable from one animal to another. Nevertheless, it is highly desirable that all necessary precautions should be taken before embarkation, and in the opinion of your Commissioners it should be mandatory that all vessels engaged in the trade should be thoroughly cleansed and sprayed with an effective specific for the destruction of tick at the conclusion of each trip, after the debarkation at destination.

One of the unnecessary hardships to which tick cattle are subjected under the present system is their compulsory confinement to the yards at Robb's Jetty. On arrival they are exposed until slaughter to the rough weather which prevails during winter. This treatment is severe in the extreme upon stock accustomed to a warm climate and natural pastures. Their sufferings on shipboard under a tropical sun in the trying voyage of ten or more days are accentuated by the artificial feeding and strange environment at Robb's Jetty, which entails further loss in weight and in condition.

Your Commissioners are unanimously of opinion that the present tick restrictions in force at Robb's Jetty should be abolished. The evidence of numerous witnesses on this point is singularly consentient. Experience extending over many years demonstrates that the climate of the South-Western division of the State is inimical to the existence of tick. Tick-infested cattle have been depastured on the coastal districts and the Eastern and goldfields areas in the past among clean stock, not only without injurious effects to the latter, but with the result that the pest has entirely disappeared. There have been many opportunities afforded those engaged in the stock trade of verifying this gratifying fact during the long course of years in which tick-infested cattle from East Kimberley have been poured into the metropolitan and Eastern districts, where numbers of them have been depastured for some time before slaughter. No reliable evidence has been obtained pointing to a reeruption, which undoubtedly would have been the case if the pest had survived. Under these circumstances, therefore, it appears needless to continue the present restrictions, which are calculated to raise the price of meat to the consumer by hampering the distribution of East Kimberley stock and restricting competition.

With regard to cattle from East Kimberley, which may be travelled along the Canning stock route, your Commissioners are of opinion that, in order to avoid any risk, such cattle should be dipped immediately before entering clean country.

The stock routes at present in existence appear to be sufficient. An ample number of wells has been provided, but the storage space is inadequate. The usual appliances at these watering-places consist of windlass, bucket, and rope. Much time is lost through lack of storage and the labour involved in raising water by hand. We recommend additional storage drives in all wells, and an equipment of whip and bucket. This would enable drovers to use their horses for hoisting, to water an increased number of stock with despatch, and allow larger mobs to be satisfactorily overlanded. Moreover, the probable effect upon the price and quality of meat to the consumer would be directly beneficial. The only route upon which there appears to be an insufficient number of wells is that between Mullewa and Mingenew, a track very largely used for stock, hence the water supplies of private owners are constantly drawn upon. Additional wells and conveniences for drawing water are therefore necessary on this route.

It is also expedient that stock routes should be more frequently inspected.

REFERENCE (3).

The facilities now available for slaughter and cold storage, tinning and other treatment, and for the sale of meat at the principal centres.

There are no public facilities for slaughter within the metropolitan area, and the only establishments in which this work is carried on are privately owned. There are six in number. Three are situated at Robb's Jetty, owned by the firms of Messrs. Forrest, Emanuel & Co., Ltd.; Connor, Doherty, & Durack, Ltd.; and Messrs. Copley Bros. & Paterson. There is one at South Fremantle, the property of Messrs. J. & L. Baker; one at North Perth, owned by Messrs. Phillips & Co.; one at Midland Junction, belonging to the Swan Meat Company, Ltd. There is another slaughter yard owned by Messrs. Hutton & co., Ltd., at present in the occupation of Messrs. Brogan & Matthews.

Three of these establishments are owned by firms who are the largest producers of stock in the State and at the same time wholesale butchers. The members of the firm of Messrs. Forrest, Emanuel & Co., likewise have a proprietary interest in the Swan Meat Company, Ltd.

The only establishments at which cold storage can be obtained are the Government Refrigerating Works and those of the Western Fresh Food and Ice Co., Ltd., in Perth, Fremantle, and Kalgoorlie. There is another plant in West Perth, now closed down in accordance with the terms of an arrangement entered into between the proprietors and the Western Fresh Food and Ice Co., Ltd. Two of the large wholesale butchering firms hold controlling interests in the Western Fresh Food and Ice Co., Ltd.

There are no canning establishments in the State, although experiments with a small and crude plant erected at Fremantle two years ago demonstrated the possibilities of this trade.

The establishment of a canning and meat extract plant at Wyndham would be a distinct advantage to the pastoralists of East Kimberley, and should likewise tend to reduce the price of beef by diminishing the cost of

production. Numbers of cattle which cannot profitably be shipped to market die annually on all the stations. During their existence they are cumbering the pastures and lowering the standard of the herds. Their utilisation for canning or extract would, by turning them into a course of profit, reduce the average cost of production per head. When it is borne in mind that little more than 5 per cent. of the East Kimberley cattle are marketed in any one year, the value of this asset, if used, will be readily appreciated.

As the quantity of cattle in the State is increasing much more rapidly than the requirements of the population, it will soon be necessary for Western Australia to establish an export trade in beef. The first step towards that end is the improvement of the herds in Kimberley, for which the weeding out of inferior stock is essential.

The prevailing practice in regard to the wholesale disposal of meat is extremely unsatisfactory. The trade is almost entirely in the hands of six wholesale firms; three of whom control the largest pastoral interests in Western Australia. These firms distribute nearly all the meat consumed in the metropolitan district, the retailers purchasing from them at prices fixed by a grader employed and paid by the sellers.

The ability of these firms, working in conjunction, to fix and maintain prices is largely due to the fact that during one half of the year almost all the beef supplies are drawn from the Kimberleys, where the principal pastoral interests of the three wholesale firms referred to are located.

REFERENCE (4).

The means employed in connection with the distribution of meat by the retail tradesmen.

The retail distribution of meat in the metropolitan area is very largely controlled by the wholesale butchers. The firm of Messrs. Holmes Bros. & Co., Ltd., which is virtually a branch of Messrs. Forrest, Emanuel & Co., Ltd., have no less than 18 shops. Messrs. Yuill & Co., Ltd., control the retail business of Messrs. Fuller, Naughton & Co., Ltd., whilst a number of other retail businesses are under bills of sale to the wholesale firms. The first choice of supplies is naturally given to shops belonging to the wholesale vendor, whilst the independent butcher has to fill his requirements from what is left.

According to the evidence given by the great majority of witnesses, the butchering business—so far as retailers are concerned—has for some years been a difficult one to carry on with success.

The testimony on this point is confirmed by the undoubtedly large number of businesses which have either been closed down or have changed hands owing to unprofitable working. The method of trading which prevails has, no doubt, had much to do with this. All the witnesses have concurred in the statement that the delivery of meat to the consumer at the latter's door adds considerably to the cost of the commodity, some of them estimating the addition at no less than 1½d. per lb. Yet the price charged to the purchaser who buys over the counter is the same as that paid at the house. There can be no doubt that the former should receive the benefit of at least 1d. per lb. difference in cost.

The independent retailer has had an undoubted difficulty in holding his own against the unfair competition of the large and wealthy firms when retail

as well as wholesale prices have been determined solely by the latter. Necessarily many of those financially weak have suffered heavily.

The methods which may be adopted to destroy competition objectionable to the large firms are indicated by the evidence taken at Kalgoorlie. There a butcher opened a cheap shop in the main street, only to find himself at once opposed by a new competitor who went especially from Perth and opened two new shops in the immediate vicinity within a fortnight of each other. Whilst the independent cheap butcher was refused supplies by the local wholesale firms, his competitor obtained what he required without difficulty, and so far as could be judged on the evidence, practically at prices fixed by himself.

Apart from this destructive competition to which any independent butcher may be subjected, the skilled tradesmen here being unable to purchase supplies on the hoof lose the opportunity of making profit by means of their judgment in buying and by the sale or treatment of the fifth quarter. The producer, too, suffers at times from a difficulty in profitably disposing of his surplus stock, which would not arise if there were reasonable competition amongst buyers.

Up to the last few months, although the wholesale price of meat was fixed, the retailer had entire freedom to determine his own retail charges. All this has been changed in Perth and the principal suburbs by the establishment of a Retailers' Association, consisting of almost all the butchers within the area it covers, from the managers of Messrs. Holmes Bros., Ltd., and Messrs. Fuller, Naughton & Co., Ltd., down to the smallest retailer.

The principal if not the only object sought when this organisation was established was to make an increase and create uniformity in the prices charged for meat, so that the butcher might make a profit in the future and make good any loss incurred in the past. The first work accomplished by this Association was the framing of a scale of charges, which all retailers were asked to enforce and which has been closely adhered to during the last four or five months. There have been instances in which firms were alleged to have sold at lower rates, and to deal with such the Association has provided for heavy penalties in proved cases.

To give itself legal status the Association has registered as a Union of Employers under the Arbitration Act. The registration of its rules under that Act enables the Association to enforce by law its scale of charges on all members and to recover from them the penalties its rules provide for any default.

There is a discrepancy in the statements on the part of different witnesses as to the adequacy of the prices fixed to give the retailer a reasonable profit. A majority declare that whilst one or two descriptions of meat could be reduced, the average price is too low to allow of profitable working. One witness (Mr. J. J. Holmes) quoted his gross profit at seven and a half per cent., a rate clearly insufficient.

The various methods of trading adopted by the different butchers lead naturally to widely differing results. A scale of charges which will not prove remunerative to a shopkeeper who carries on a family trade by means of a large and expensive staff of employees and a number of delivery carts, and who occupies premises at a high rent in the city, may well prove profitable to the smaller man personally managing his own business and doing his principal trade for cash over the counter.

The enforcement of uniform charges upon both classes of shopkeepers is detrimental to the small trader as well as to the public. Its effect must be to give closer control to those wholesale firms which have their own retail shops.

REFERENCE (5).

The methods employed in the other States of the Commonwealth, with a view to the adaptability of those methods to the conditions existing in this State where found satisfactory.

Your Commissioners made every possible effort to secure information locally in regard to the methods employed in the other States, but the evidence available was too vague to be of any value. All requisite details can, doubtless, be obtained by the Government if one of the local departments be requested to enter into correspondence upon the subject with the Governments of those States. The one important fact disclosed to the Commission was the existence of public abattoirs in the principal cities of the Eastern States, with saleyards for stock usually in close proximity.

It may here be mentioned that your Commissioners ascertained that in 1897 Mr. M. F. Cavanagh, F.R.I.B.A., an architect, of Perth, was commissioned by the Government of the day to visit the capital cities of the Eastern States in order to investigate the methods there employed at the abattoirs and saleyards with a view to preparing plans suitable for our metropolitan district. This mission accomplished, plans and specifications were drawn at a cost of £500. These plans and specifications are still in the hands of the Government.

REFERENCE (6).

The alleged refusal of wholesale sellers to supply certain retail sellers alleged to have sold under fixed prices.

There can be no doubt that the wholesale firms have refused supplies to certain retailers, whose prices were lower than those agreed upon by the Retailers' Association. There is a quantity of meat not of first quality available in the market, particularly during the Kimberley season. This is necessarily sold to the retailers at a lower price than the best grades, and retailed to the public at a reduced rate. The Association decreed that meat sold under the cost of prime joints should be disposed of only at one place in the metropolis, viz., the Stirling-street Markets. The sale of this lower-priced meat by butchers in other localities was ostensibly the reason for stopping their supplies.

Your Commissioners consider it grossly unfair to those consumers—whose circumstances may unfortunately require them to purchase at the lowest rates—that they should be debarred from doing so, no matter where they live, at any but one place. It seems more than probable, having regard to the quantity of beef of the lower grades at times in the market, that a proportion of it is sold at high prices in other parts of the city and suburbs.

Whilst the control of supplies remains in the hands of a small number of wholesale firms it will always be possible for them, by arrangement, to squeeze out a retailer whose methods or prices are objectionable to them.



STATE FARMS.

No. 1.—Farm Buildings, Nangeenan.

No. 2.—Homestead, and turnips under irrigation, Nangeenan.

No. 3.—Shropshire Sheep, Chapman.



Apart from the butchers to whom supplies have been refused, the representatives of some of the wholesale firms admit that they will not supply any persons who desire to enter into business in competition with existing butchers, even though the would-be customers might be prepared to pay cash for their goods. This power, exercised by those already in the trade themselves, to prevent fair competition, cannot work to the advantage of the public. Nor can it be justified except by those who advocate the maintenance of a monopoly.

REFERENCE (7).

And generally into the methods which being adopted may reasonably be expected to lead to a reduction of the prices of meat to the consumer.

The methods which may, in the opinion of your Commissioners, reasonably be expected to cheapen the prices of meat to the consumer, are the following :—

- (a.) The proposal to allow certain cattle in East Kimberley to be driven to Derby for shipment.
- (b.) The provision to permit the same vessel to ship cattle from East and West Kimberley.
- (c.) The removal of the tick restrictions at Robb's Jetty.
- (d.) The improvement of stock routes.
- (e.) The establishment of yards for regular stock sales in the metropolitan area and at other populous centres.
- (f.) The establishment of public abattoirs in the same centres under the direct management of either the Government or the municipal authorities.

The existence of public saleyards would afford an opportunity for the producer to dispose of his stock direct to the retailer, destroy monopoly in the butchering trade, and thus tend to eliminate the profit of the wholesale butcher. The saleyards would, however, be useless unless facilities for slaughter were available to the retailer.

Apart from the cheapening effect these establishments would exercise upon the price of meat, they would have a direct advantage to the public inasmuch as they would reduce the cost as well as increase the efficiency of the meat inspection.

At present that inspection is as thorough in the metropolis and at Kalgoorlie and Boulder as it can be made under existing conditions. When public abattoirs are provided, slaughtering should be permitted only when an inspector is in attendance. Private slaughtering establishments should, in the opinion of your Commissioners, be made to bear the expense of inspection when killing is proceeding. No licences should be granted for new slaughtering establishments in localities where public abattoirs are provided.

Outside the metropolitan areas and the goldfields there is at present no proper meat inspection. Although somewhat outside the scope of this inquiry, your Commissioners advise, in the interest of public health, that such supervision should be provided at all centres. Evidence indicates that with reasonable application, intelligent health inspectors could qualify as meat inspectors; and at places where no inspectors of the Central Board of Health are provided, they should be required to do so.

In addition to the foregoing recommendations, your Commissioners desire to emphasise the opinion expressed under Reference (3), that the establishment of works for the canning and extract of meat would, by cheapening production, undoubtedly tend to reduce the cost of meat to the consumer.

(Signed) R. W. PENNEFATHER (Chairman).
ROBT. LAURIE.
H. DAGLISH.
W. D. JOHNSON.
W. B. GORDON.

HISTORY OF THE MEAT INDUSTRY.

A lecture on the history of the meat industry was given at the College of Agriculture, Edinburgh, on November 2nd, by Mr. Loudon M. Douglas, of Edinburgh, who is well-known as a writer and lecturer on the subject of foods and the various branches of industry associated with the meat trade. It is interesting to note that it was the first occasion upon which the meat industry has been recognised in an academic capacity. There has been a strong effort made within the last year or two to place the meat industry, in common with other skilled occupations, upon an academic basis and this series of lectures is the first step towards accomplishing that desirable end.

The lecture formed the inauguration of a winter course being delivered by Mr. Douglas at the same place. These lectures deal with cattle markets, abattoirs, refrigeration, the meat supply, laws affecting the meat trade, meat inspection, diseases of animals used for food and their detection, pickling and curing of meats, the manufacturing of small goods, etc., etc. It has also been arranged that a number of excursions to different places in connection with the meat industry will be made so as to study the actual practice as carried out.

In the opening lecture, Mr. Douglas referred to the great importance of the subject, and the total absence of any systematic method of teaching it. The meat industry in all countries had sprung up in the most casual way and its origin rests in obscurity. The ancient laws on the subject were now obsolete, but no doubt called for at the time they were enacted.

The substances obtained from a bullock are numerous in number, and are applied in many departments of industry. It is necessary, therefore, that we should know more about them. No doubt the food used by various nations suited their habits, but there must be some law governing the whole. Various specific instances of curious customs were given by the lecturer, who also illustrated his points with a wide range of lantern slides.

In so far as the history of the meat industry is concerned, Mr. Douglas traced it from the earliest time to the present day and made many interesting references to old laws and customs. The Trade Guilds were specially

interesting and they had been strong in Scotland, but their influence was also extensive in other countries. They had been done away with, however, and were now represented, so far as the United Kingdom was concerned, by a National Federation of Meat Traders Association, whose duty it was to foster and develop technical education throughout the trade.

The lecture was attended by the President of the Master Butchers' Association of Edinburgh and all the officers, who were accompanied on the platform by Professor Wallace, of Edinburgh University, and Judge Macpherson, who occupied the chair.

The proceedings were very enthusiastic throughout and the lecture was much applauded, as were also the appreciative speeches which followed its delivery.

THE MEAT INDUSTRY.

CATTLE MARKETS AND ABATTOIRS.

The second of a series of lectures on the Meat Industry, which have been organised at the College of Agriculture, Edinburgh, during the present winter session, was given on November 16th by Professor Loudon N. Douglas, the subject being "Cattle Markets and Abattoirs."

The lecture was very largely attended, and the enrolments at the finish showed a total membership of about 150, which is gratifying testimony to the wide interest that these lectures have elicited. Amongst those present were the principal members of the meat trade of the Edinburgh district, including the President of the Edinburgh Meat Traders' Association, and there were also many representatives of the veterinary profession present, as well as others.

The lecturer said that cattle markets had been in existence in this country from time immemorial. They had proved to be the best method of exchange of live stock between farmer and meat purveyor, and much interesting history was attached to them. The most noted cattle market in the United Kingdom was that at Smithfield, London, which dated back to 1614 and preserved an unbroken record up to 1868. As they were aware, Smithfield market was the largest meat market in the world, and was now known as the Central Meat Markets, having cost over one million pounds to build. The present markets were of large dimensions, and as the supplies during last year amounted to 419,037 tons, some idea of their proportions can thus be gained. Unfortunately, only 20½ per cent. of this meat was home grown and the tendency was to altogether diminish the supply of home meat in preference to that from other countries.

In dealing with the technical arrangement of cattle markets, the lecturer stated that these should adjoin abattoirs if possible, that they were simple in construction, but that regard must be had to hygienic rules, and such requirements as impervious paving and iron railings were essential.

The standing room necessary for cattle might be given at 5ft. wide by 8ft. long, and in averaging for other animals the area might be taken as 18in. wide by 5ft. long for each. While a cattle market might be simple in construction, it was essential that it should be so designed as to render it a comfortable place of business. The lecturer then entered into an elaborate description of abattoirs, and, by the aid of many drawings and lantern slides, was able to show the best modern construction of these and to illustrate what was considered to be good practice, not only in this country, but in many countries which he had visited.

The departments of a modern abattoir might be stated as follows:—

- (1.) Lairage.
- (2.) Slaughtering rooms or halls, subdivided into:—(a.) Hall for cattle. (b.) Hall for sheep and calves. (c.) Room for pigs.
- (3.) Cold chambers for maturing and storing meat.
- (4.) Offal room and tripe house.
- (5.) Meat Inspectors' room.
- (6.) Room for condemned meat.
- (7.) Destructor room for the utilisation of condemned meat.
- (8.) Engine and boiler house containing:—(a.) Steam boiler. (b.) Steam engine. (c.) Refrigerating machine.
- (9.) Manure dépôt.

With regard to the appliances, Mr. Douglas showed a great many different tools used in modern abattoir practice, and gave demonstrations with various humane slaughtering implements which had been kindly lent him for the occasion. The principal of these were Behr's slaughtering pistol and Greener's humane killer, and the R.S.P.C.A. humane killer. The effect of those implements was compared with the pole-axe, and the advantages were clearly shown.

In connection with the fittings, the lecturer showed a number of excellent models, demonstrating the construction of tracking, hanging-hooks, and other necessary appliances which were indispensable in a modern abattoir, and emphasised the fact that such conveniences must be supplied so as to properly conduct the business.

In addition to the main business which was carried on in abattoirs, there were many subsidiary businesses, such as the drying of blood, cleansing of the intestines, manufacture of tripe, treatment of diseased carcasses, and the manufacture of fertiliser from waste products; but the lecturer stated that each of these subjects would require a lecture devoted entirely to itself, and he hoped, as they had begun so well, that the interest would be so maintained that next year he might be able to have a much more extended course of lectures, so as to discuss these and other important subjects in greater detail.

Before concluding he wished to say a word with regard to a subject which was largely in the minds of meat purveyors at the present moment, namely, the question of meat warranty. It would be seen that when we had got ideal cattle markets and abattoirs, both of which were designed with a view to regulate the meat business, that there should be some clear understanding as to who should be responsible for the live animal. It was obvious that precautionary measures for the protection of the public, in so far as diseased meat was concerned, would be stricter in the future than hitherto, and it

seemed only reasonable that if the community required that an animal found to be diseased on being slaughtered should be confiscated, the loss should be borne either by the community or by the original vendor of the animal. It was preposterous that the meat purveyor, who was quite unable to detect whether an animal was sound or otherwise—there being no ready means of doing so—should have to be at the loss of such an animal, for which he had paid good money. The lecturer recited the facts of the case and proceeded to indicate that it was not unlikely that some suitable adjustment might take place in the beginning of January next.

It was intimated that the next lecture would be given on November 30th and would be entitled "The Application of Refrigeration to the Meat Industry."

ADAPTATION OF PLANTS TO ENVIRONMENTS.

By A. MORRISON, M.D., Botanist.

As the land composing the State of Western Australia has been for many ages undisturbed by upheavals of a geological nature, the soil and climate must have varied very little during all that time, so that at the present day the conditions of existence for organic beings may be taken to be similar to those prevailing many thousand years ago. Through all this time successive generations of plants have been accommodating themselves to the conditions surrounding them, with the alternative that, if they could not so adapt themselves, they would suffer extinction. Individual plants that have for any reason been able to withstand particular trying conditions better than their companions have in consequence of this survived, and their descendants, through their possession of those qualities, have continued on their course. A certain amount of modification of structure will accompany, if it be not the cause of, this power of resistance, and when further modifications of the same kind arise, or others equally favourable, or other characteristics are introduced by crossing with different forms, the plant may thus, by a process of natural selection, be so much altered from its original form as to constitute a distinct species. Long continued drought, for example, would impose such a test of the endurance of plants; and as a matter of fact, drought, periodic or constant, is the most prominent and characteristic feature of the environment of plants in Western Australia. In only a few other regions on the earth's surface is aridity of climate so pronounced as in some parts of Australia, and yet the driest parts of its area are furnished with plants able to live through it and propagate their kind. We are thus led to infer that our native plants must be particularly well adapted to droughty conditions, while the duration of this dry environment and of the resulting structural modifications, seems to suggest the idea of fixity of the forms now existing.

seeing that a long-continued succession of similar seasonal cycles, with little disturbance of soil conditions, must in the course of time have brought each form of plant to a state of perfection in its adaptation to this unvarying environment.

ACQUIRED CHARACTERS.

According to Weismann and others, acquired characters cannot be inherited, the germ plasm being continued unaltered in structure from parent to offspring, and therefore incapable of producing new characters; so that no matter how highly any particular characteristic may be developed during the lifetime of an individual organism, that characteristic cannot possibly be inherited by the offspring, at birth that is to say. Hence they deny the correctness of part of the theory of development propounded by Darwin, who believed that the inheritance of acquired characters was one of the means through which new species arose, besides the crossing of one species or variety with another. All depends, however, on the sense in which the characters called "acquired" have arisen. If acquired characters were heritable in the sense that the progeny at birth would be provided with them, then an animal or a plant at various stages of its course through life ought to produce descendants showing characteristics corresponding to those acquired by the parents at particular stages. Although the traits evolved in an organ or tissue by the action of particular stimuli brought to bear on them in their environment may not appear in the progeny at their birth, there is at least no reason to suppose that the descendants should be less capable of developing the same characteristics in a similar way. On the contrary, each successive generation subjected to the same conditions—to the same stimuli or the same absence of stimuli—may carry the development of a characteristic further and further to an indefinite degree, and the capacity for such specialisation may become greater and greater the longer the favouring conditions keep the same. We can scarcely impose a limit to the degree to which an organ may develop under special stimuli, or to the successive forms an organ may pass through in a long series of generations, all under the action of the vital forces inherent in the germ cells. If an entirely new organ or a structure of a different type were supposed to be included in the expression "acquired character," it would be quite reasonable to doubt the possibility of such being produced in the individual or inherited by the descendants. But if the specialisation has taken place simply from the action of the stimuli encountered in the environment on the qualities inherent in the germ cells of the organism, it seems quite reasonable to expect that not only the capacity but the structure evolved on typical lines may in time become fixed and heritable, and when by the action of the external forces (such as drought) educing these new traits those organisms lacking them are cut off on account of unfitness, the characters of those surviving may be very unlike the originals. Apart from the direct inheritance of acquired characteristics, however, a highly developed trait may have an important influence on the capacity or chances of an individual plant or animal so provided for effective crossing with another variety.

STRUCTURAL MODIFICATION.

The structural modifications by means of which plants are enabled to live and flourish in dry climates are very varied and interesting. In some

cases the plant as a whole, or particular organs, are highly specialised to cope successfully with drought, while the great majority of our species show some indication in their structure of the necessity that exists for special provision against this feature of the climate. In considering the question of how this is effected it is necessary to study the relation of the plant to water, the element of most vital importance to it. Plants live and grow by the absorption of water from the ground by means of their roots, which serve also to keep them in a fixed position. This water finds its way through the stem and branches to the leaves, from the surface of which it is exhaled into the air. It is not pure when it enters the plant, but contains dissolved in it in small quantities a number of different mineral substances necessary in the formation of its tissues. Sometimes, however, these ingredients in the water are prejudicial to the growth of the plant, and may cause its death; in other cases they may be tolerated or even favourable to growth, while in others again they may be the cause of peculiarities of structure sufficiently pronounced to have caused botanists to describe as distinct species plants so modified by the absorption of water charged with a particular mineral substance derived from the soil in which they grew. These substances in the soil may be injurious to the majority of other plants, so that toleration of them by a particular variety may be the means of its advancement and spread, through being relieved from the competition of other plants in that soil.

The great bulk of the woody tissues of plants, however, is not derived from the water supplied through the roots, but from the atmosphere, which contains carbonic acid gas, the source of the element carbon, the chief constituent of wood. The extraction of carbon is effected by the vital action of the leaves in their performance of the function of respiration. In a large tree bearing many thousands of leaves it can be understood that a very great quantity of water is required for its growth, but if the soil does not contain much or soon becomes exhausted the growth will be proportionately restricted. In soils that are very dry or liable to become so at particular seasons plants must be modified in some such way as will enable them to do with a scanty supply of water. One obvious way in which moisture may be secured, even during the dry season, is by an extension of the root system to the deeper strata of the soil, which are less subject to the desiccating influence of the sun and atmosphere than the superficial layers. As we have a very long dry summer we should expect to find the great majority of our native perennial plants to have roots long enough to reach deep into the ground. Examples of this may be found by anyone who will take the trouble to dig deep enough. As an example, let me mention *Calythrix flavescens*, a small shrub less than a foot high, that makes the sandy scrub gay with its bright yellow flowers during the hottest months of summer, when the majority of flowers have faded. It will be found that the clusters of branches appearing above ground spring from a root-like underground stem running horizontally at 3 to 6 in. below the surface, and that the true roots for absorbing moisture are attached to this and extend downwards to a lower stratum of the soil. In like manner the bush casuarina (*C. distyla*) of the sandy scrub sends out underground shoots which at intervals come to the surface as young plants, thus helping in its propagation independently of its seeds. The same thing occurs more strikingly still in the Christmas tree (*Nuytsia floribunda*). When this tree becomes broken

down, as easily happens on account of the brittleness of its wood, or succumbs to a bush fire, it frequently occurs that within a radius of a few yards from the old tree a large number of young bushes have made their appearance, sometimes in a circle, and these are found attached to underground shoots given off by the old stock at various depths below the surface of the ground.

ROOT SYSTEM.

These plants illustrate one arrangement by which the drought of a long dry summer, and other untoward conditions may be overcome; but there are many other ways in which the root system is modified in a special way to retain life in the plant, and even at shallow depths in the soil. Such are seen in bulbs, tubers, and various forms of swollen roots or underground stems, in all of which water is stored up during the wet season of the year, that the germ of the plant may be kept alive through the droughty period, to start into active growth again when the next rains supply moisture sufficient for the growth of a new plant which forms roots and provides a new bulb or succulent organ in which water is again stored up. It is not solely in the underground portions of plants that this storage of water is effected; we see it also in the stems and branches of plants such as those of the *Cactaceae* and some *Euphorbiaceae*, giving them quite a peculiar character. This type of plant is seen in the most arid regions, where only a scanty rainfall over a short period of the year must be made the most of for growth and storage, before the hot, dry air takes it all back from the ground. Active transpiration is not possible in these dry surroundings, and as leaves are not required to carry off surplus water they are suppressed altogether or reduced to scales or prickles, the stems themselves taking their place and performing their functions to the extent required. In these plants, and in succulent plants generally, water is stored up in cellular tissue set apart for the purpose, to be drawn upon when necessary. There are many native plants around us with succulent leaves in which water is stored against drought, such as the saltbushes, mesembryanthemums (or "pig-face"), members of the portulaca family, including the ice-plant, in which water-containing cells on the surface of the leaves glisten like particles of ice. Some of the lobelias—poisonous plants not uncommon with us—frequently have their juices so carefully stored and protected from evaporation in stem and flower that we may find plants still standing upright in the ground, flowering and ripening their seed, although the root and lower part of the stem with the leaves on it are dead and brittle. Others, of the portulaca family, are so retentive of life that they may be used for room decoration without water for weeks or months, while under heavy pressure within sheets of drying paper they continue their growth for long periods.

THE LEAF.

As the leaf is the respiratory organ of the plant, besides being concerned in transpiration, its formation and intimate structure are important objects of study. The leaves are in direct continuity with the roots through the medium of the vascular fibres, which pass from the roots through stem and branches, and from these through the stalk of the leaf, breaking up on entering its blade into an expanded network visible to the naked eye, so that every minute portion of its area is supplied with water. The surface of the



NANGEENAN STATE FARM.

- No. 1.—Growth of Mazzagua.
 No. 2.—Irrigation.
 No. 3.—Maize under irrigation.

leaf is studded over with minute pores, which allow the water to escape into the air as vapour, and at the same time let in the air for respiratory purposes. The small cavities to which the pores or stomata give access are lined with delicate living cells which are the active agents in the function of respiration or breathing. The carbonic acid gas entering with the air becomes dissolved in the water that has ascended from the roots, and is thus presented to the active living cells which decompose it into the oxygen which escapes into the atmosphere, and the carbon which is appropriated for the formation of the woody tissue of the plant. The breathing pores or stomata are so affected by the state of the atmosphere that when it is very dry the two cells guarding them so alter their form and position as to close the opening, which with a moist atmosphere and a full current of sap flowing they become more turgid and bulge outwards so as to form an opening that allows communication with the air again. It can be well understood that in a dry climate a large distilling apparatus of the kind indicated would not generally be suitable; for lack of moisture it could not be kept in action. The extensive scale on which broad-leaved trees in a moist atmosphere transfer water raised from the ground to the air has to be reduced, so that the quantity exhaled shall be proportioned to the amount present in the soil. Accordingly the broad leaves, with innumerable breathing pores, must have their surface diminished in extent, and the cellular tissue and stomata reduced in proportion. In conformity with this requirement we find that in a very large number of our local plants the foliage is of a very stiff, spiny, and harsh character, the soft cellular tissues being reduced to a minimum, the leaves being narrow, with prominent ribs, and ending in sharp points.

As we have a copious rainfall in the winter months, a luxuriant growth of some broad-leaved plants is encouraged, but the leaves of such, not being deciduous, are protected by many interesting devices from the influence of the dry air and hot sunshine of summer, which directly tend to induce transpiration and rob the plants of their moisture. The leaves of the eucalypti, acacias, and others are set in a vertical position, so that their surfaces will be parallel to the sun's rays at the hottest time of the day, and so receive less heat. In others the leaves are covered with hairs, especially on the under surface, and sometimes they, or the whole plant, are enveloped in a covering of hairs so dense and so matted together as to resemble thick flannel or blanket. Such a covering not only protects the substance of the leaf from excessive heat or cold or other injurious influences, but it may retain for a considerable time such moisture as may come to it from rain or dew, to the benefit of the plant. During the growing season leaves may be somewhat soft and delicate, but with a gradually increasing intensity of sunshine and dryness of the air, the superficial layer of cells forming its substance may become thickened into an impervious cuticle, preventing evaporation of the moisture below, and modifying the effects of the light and heat of the sun. In other cases fluids are excreted on the surface of the leaf, so that the epidermis is protected and the stomata effectually sealed with wax, gum, resin, or lime. In some leaves the stomata are so deeply sunk below the surface as to be removed from the direct action of the light and heated air, or they may be situated in the bottom of grooves which themselves become shrunk and partly closed when the air is dry. In some grasses and sedges you may observe that as they grow the leaves are quite flat, but shortly after the stalk is plucked you find that the leaves have lost their flat character and appear

curled up lengthwise, the change being due to the stoppage of the sap current when the stem was severed from the roots. One of the plants which come into flower about Perth is *Grevillea oxystigma*, a small shrub with abundance of white blossom. As long as the rainy season lasts the leaves are mostly flat, but at a later date, in the dry season, they appear more often as doubled-barrelled tubes, each half of the blade having curved backwards to the midrib, as if to exclude the dry air from the under surface, which is already protected by a covering of minute hairs. This rolled condition appears to be more constant in the drier districts of the interior, such as Kellerberrin or the Stirling Ranges, while in these localities other species of *Grevillea* show the peculiarity in a still more pronounced degree. The rolling back of the margins is often so tightly effected in some plants, that the leaf must be broken up in order to see the hidden under-surface. From this condition of the leaf it is only a step further to one that is quite solid with the under-surface obliterated and a groove marking the position of the midrib; and from that again we easily arrive at the terete form, as it is called, like a knitting needle, quite smooth all round, presenting to the air the least possible area of surface, and ending in a sharp point most frequently.

INJURIOUS EXTERNAL INFLUENCES.

It is interesting to note how the stems of trees and other plants are protected from injurious external influences. In a visit to the North-West I was struck with the fact that the few trees seen had their trunks and branches provided either with a rough, thick corky bark or had them smooth and quite white, as if painted with a cooling composition such as that applied to the roofs of houses. In either case it evidently serves as a protection from the excessive sunshine and heat of the region. The heat of the sun and air is probably the cause of the development of the thick protective cuticle, like that on the palm of the village blacksmith, and the white stems reflect the light and heat of the sun, so that the interior of the stems will not suffer injury.

When the moisture in the soil is not pure water, but contains particular substances dissolved in it such as salt, many plants would be killed or injured if planted there, while others, like saltbushes, would grow and thrive. The saltbushes may grow well in an ordinary soil, so that a distinctly brackish condition is not indispensable to them; but they have a tolerance or affinity for salt, and may extract more of it from an ordinary soil than other plants do, and store it up in their tissues. They thrive better in a moderate degree of brackishness, however, and their roots, when not in active growth, might suffer no injury from a somewhat concentrated solution of salt, as those of other plants would.

PROTECTIVE COVERING.

The subject of the adaptation of plants to their surroundings may be said to be co-extensive with the vegetable kingdom, and we may go on speaking of examples of their ways and means of doing so indefinitely; but it would be advantageous to consider some of the means by which the economically important family of grasses maintain their position under trying conditions. In some grasses—for example, *Sesleria tennifolia*, a South European species—a remarkable intricately-woven tunic is provided for the covering and protection of the lower parts of the stalks. The sheaths of the lower leaves—

the part of the leaf embracing the stem—are composed of longitudinal and crossing zigzag fibres so woven together as to form an intricate network in the tissue of that part of the leaf. When the upper part of the leaf withers and drops away in dry weather this fibrous net remains as a protective clothing for the stem of the grass during the trying period between summer and the following spring. Instead of having a woven fibrous tunic the base of the leaf sheath may be more straw-like in its nature, as in some of our native grasses—in drought, however, either texture is calculated to protect the plant, to absorb moisture when the chance occurs, and to retain it for a longer or shorter time during intermediate dry periods.

In Australia and South Africa another form of protective covering has been evolved in the native grasses of those parts of the world. On the bases of the leaf sheaths, instead of woven fibre or straw as described, we find a great development of hairs of a woolly nature so copious as to completely cover the base of the stem and give it a bulbous appearance. These woolly hairs are sometimes woven into a feltlike fabric of appreciable thickness, giving effective protection from injurious outside influences, and at the same time preventing the escape of moisture, while it absorbs water from the atmosphere and retains it for the replenishment of that required in the vital processes carried on in the living tissues of the plant. *Eragrostis eriopoda*, a North-West grass, gives a typical example of this arrangement, which may also be observed, though to a less degree, in other species of *Eragrostis*, *Stipa*, *Panicum*, *Danthonia*, etc. It would be easy to demonstrate the power of this felted tunic to retain moisture by wetting a clump of one of these grasses and a similar clump of another grass unprovided with a hairy covering, and laying both in an open place to dry, when it would be found that the felted covering would still be moist long after the other had become perfectly dry.

In the sandy soil about Perth and in the South-West generally during the spring months may be seen a tall purplish grass, bearing at the top of its stalk a loose bunch of flowers somewhat resembling quaking-grass in shape. This is *Poa nodosa*, which grows up during the wet season, and continues for some time further into the dry period, flowering and ripening its seeds when the sand in which it grows is almost constantly dry. If the base of the stem is examined there will be seen one, two or three bulbous swellings of the base of the stalk, just below the surface of the sandy soil. These swellings are succulent, and contains a store of water in anticipation of the plant's needs during the course of the long periods of dry weather that are sure to follow. A similar formation is found in a variety of the well-known Timothy grass that grows in the drier districts about the Mediterranean Sea. There is no specific difference between this variety and the typical form (*Phleum pratense*) found in moister localities, beyond the presence of the bulbous swelling of the underground stem; and when this form is transplanted to cultivated ground and supplied with sufficient moisture, the stems lose their bulbous character. Whether Timothy grass grown in dry localities in Western Australia ever assumes this bulbous form, perhaps some of our agriculturists may be able to say. If it should be able to adapt itself to our climate it may be worth encouraging for that reason alone; but whether the bulbous form be imported as such from its native steppes or modified from the ordinary form by a process of acclimatisation, it would be scarcely reasonable to expect it to possess the same succulence as the grass grown with abundant moisture. It might prove of value in dry districts, but at the same time our

native grasses, long used to the climate, may be found, if properly tested by experiment and analysis, to be quite as nutritious.

INDIGENOUS FODDER PLANTS.

Under a sort of fatuity we neglect the plants growing in our own soils and search all over the world for new kinds of fodder plants, without giving a thought to those growing in our vicinity. There are many grasses and saltbushes adapted to withstand the most severe droughts, and all that is done is to take advantage of the bounty of nature and use up all the herbage provided till it is in danger of extermination. The grasses are known to be highly nutritious, but no steps are taken to preserve them or to extend the area of their growth; while the saltbushes, though they have been analysed and proved in foreign countries to have high feeding qualities, receive scarcely any consideration, as if they were thought as indestructible as the sand or as inevitable as drought. In connection with this subject we have to distinguish between perennial plants and annuals. The pastoralists are concerned with the former, but their scheme of exploitation of the country grazed upon does not include provision for the future continuance of the fodder plants originally provided. On the other hand the cultivator of the soil imports plants from foreign countries, apparently without always considering whether the conditions of existence here are fairly comparable with those of their home country. Fodder plants from India, with its combination of heat and moisture, may grow here, but they could not be expected to do as well in our dry season as in their own home. Some plants from that country or from the basin of the Nile might produce abundance of fodder or fruit, with the help of irrigation; but land is so plentiful and the population is so scanty in Western Australia that irrigation does not recommend itself to cultivators.

CHAPMAN STATE FARM.

The manager of the Chapman State Farm has reported that during the month of October the principal work consisted in cutting $11\frac{1}{4}$ acres of barley for ensilage, and also the hay crop. Fifteen acres of fallow were cultivated with Japanese millet and drilled in for summer fodder. All the stock looked remarkably well.

During November 40 tons of hay were harvested and stacked, being sufficient for summer and winter fodder. The various plots of wheat and barley proved satisfactory. Bunyip wheat averaging 27 bushels per acre. Shearing operations were completed during the month, some fleeces from Lincoln-Merinos weighed up to 5lbs.

FORECAST OF THE WHEAT, OAT, AND HAY CROPS OF WESTERN AUSTRALIA.

Office of Government Statistician, Perth, 31st December, 1908.

From the Reports received in this Office mainly from the Inspectors of the Lands Department, the estimated average yields per acre in the various Districts of the State are as follows :—

District.	Estimated Average Yield per acre.			
	Wheat.	Oats.	Wheaten Hay.	Oaten Hay.
	bushels.	bushels.	cwt.	cwt.
Victoria	9·6	14·0	15	15
Swan	8·0	12·0	20	20
Wellington	9·0	12·0	20 to 25	20 to 25
Sussex	12·0	30·0	20	22
Northam	8·0	12 to 15	15 to 20	15 to 20
York	9·0	12·0	15	15
Beverley	12·0	18·0	18	20
Pingelly	9·5	14·0	16	16
Narrogin	8·5	13·0	15	15
Wagin	9·0	15·0	15	15
Katanning	9·0	14·0	15	15
Tambellup	9·0	15·0	16	16
Plantagenet	12·4	23·0	21	20

The complete forecast for Western Australia, as compared with the records of last season, is given in the following table :—

Wheat, Oats, Wheaten Hay, Oaten Hay.

Season 1907-8.			Season 1908-9 (forecast).		
Area.	Production.	Average per acre.	Area.	Production.	Average per acre.
<i>Wheat.</i>					
acres.	bushels.	bushels.	acres.	bushels.	bushels.
279,609	2,925,690	10·46	311,300	2,854,500	9·17
<i>Oats.</i>					
46,667	721,753	15·47	55,300	780,500	14·11
<i>Wheaten Hay.</i>					
	tons.	tons.		tons.	tons.
95,123	103,351	1·09	104,800	79,700	0·76
<i>Oaten Hay.</i>					
33,854	32,483	1·00	38,300	34,400	0·90

As regards the separate districts, from only one of these, Tambellup, fortunately at present only a small, and for that reason comparatively unimportant Statistical District, no estimate of the acreages has been received, although every effort has been made by this Office to obtain it, and last season's figures have consequently had to be adopted. From two other Statistical Districts, York and Beverley, no return had, until recently, come to hand from the Land Inspectors, but this deficiency has now been supplied by the courteous assistance of the local Police Officers.

Police Inspector C. Woods, at Northam, has forwarded a report for the York Statistical District, received from Corporal J. Teahan, at York, and containing the following particulars, supplied by Constable D. Johns :—

"The figures herewith submitted are based on enquiries from the leading farmers, and constitute, I think, a fairly accurate return :—

Crop.					Estimated yield per acre.
Wheat	..	..	..	..	9 bushels.
Oats	..	..	..	..	12 "
Wheaten Hay	..	..	..	..	15 cwt.
Oaten Hay	..	..	..	..	15 "

Owing to the peculiar nature of the season experienced in the York District, it was found impossible by some of the older settlers to sow all they intended ; but this deficiency is probably a little more than made up by some holdings newly acquired, which have a few acres under crop. Regarding the estimated yield per acre, I think, when the collection of Statistics is completed, and the figures compiled, my estimates will be found fairly correct, as in many instances the crops this year are more or less a failure, on farms too where this has never before been experienced."

From Beverley, Constable H. W. Wood has forwarded the following estimate :—

Crop.					Estimated yield per acre.
Wheat	..	..	..	..	12 bushels.
Oats	..	..	..	..	18 "
Wheaten Hay	..	..	..	..	18 cwt.
Oaten Hay	..	..	..	..	20 "

The Government Land Agent in the Beverley District, Mr. T. G. Walker, also writes as follows :—"The yield, I have ascertained, will exceed the expectations of the early part of the season. In some cases it is over 4 bushels more than was expected, and in no case have I heard of it being less than one bushel above the anticipated average yield."

It is to be regretted that, owing to an unusually heavy amount of departmental work which has this year occupied the special attention of the Inspectors of the Lands Department, these Officers have in most cases not been able to give to the very important duty of collecting data for the crop forecast the time and attention which that importance undoubtedly deserves. It is highly probable, I am afraid, therefore, that the accuracy of the estimates has suffered accordingly, as these estimates have had to be based entirely on the very meagre information available. It will be seen that the estimated average yields for the State are unfortunately comparatively low. It will also be remembered that the earlier part of the season looked very unpromis-



Potato bacteriosis.



Potato bacteriosis.



ing, and possibly the view then taken may have impressed itself on later reports. It is to be hoped, therefore, that the harvest, when the general data have been collected, may prove to have been a more favourable one than was anticipated, or than is indicated by the present figures.

It is quite apparent that the time has now arrived when some better and more constant arrangement should be made for obtaining these especially important returns periodically, more particularly in view of early provision being made for the export shipment of any surplus yield.

W. SIEBENHAAR,
Deputy Government Statistician.

CORRESPONDENCE.

FEEDING VALUE OF SILAGE.

"Enquirer" writes:—Dear Sir,—As one who has been interested in Mr. Kinsella's lectures and papers on dairying, I should like to ask a question. In his lecture before the Agricultural Conference in August, Mr. Kinsella stated that the feeding value of silage was 8d. to 10d. per 100lbs. (at 9d. this would be 16s. 9d. per ton), and that the cost of making the silage at the Brunswick State Farm was 5s. per ton. Would Mr. Kinsella kindly explain what crops there are that a farmer can produce at a cost of 11s. 9d. per ton in the stack, and how is he going to do it?"

The Dairy Expert replies as follows:—

"1. The reference to the statement made at the Conference is correct.
2. My remarks, however, are being applied to an entirely different subject.

3. The fodders referred to cut 10 to 13 tons per acre.

4. As recommended, if additional solid food is added to the ensilage the feeding value of the latter is greatly enhanced.

5. Crops cured dry in stack 'referred to' are not the most suitable for producing large quantities of milk, and usually average only $1\frac{1}{2}$ to $2\frac{1}{2}$ tons per acre.

6. Even with well-cured crops in the stack thousands of farmers are to-day turning over a profit by converting such hay into milk through the medium of the cow, and are at the same time enhancing the value of and increasing the fertility of their land by keeping more stock."

COLD STORAGE OF POTATOES.

Mr. Andrew Currie, of Inverdon, Cranbrook, asked as to the best method of storing potatoes for about six months.

The Manager of the Government Refrigerating Works, Mr. A. D. Cairns, supplies the following information:—

"Only perfectly sound, fully developed seed, free from pest, scab, or defect, should be put into store within ten days from the time of digging.

The potatoes should be packed in handy, ventilated boxes, such as fruit or banana cases, care being taken that the seed is not bruised, cut, overheated, or sweated under damp bags or packing, and that it is free from dirt. The charge for storage is but nominal, viz., 1d. per week per case (56lbs.).

"The seed potatoes should be removed from the store about a couple of weeks before it is intended to plant them, and the shoots allowed to grow any desired length."

POTATO BACTERIOSIS.

We have received the following letter from a settler at Yarloop describing the attack upon his potato crop by some disease:—

"I am forwarding, under separate cover, a potato plant affected with a disease which I would be glad if you would identify and inform me of the best methods to cope with it. It makes its appearance when the plants are in bloom, chiefly in summer crops. The plant withers from the top or ends of foliage suddenly, and dies quite away in a short time. It never takes the whole crop but comes in patches of a plant or two, here and there, and seems to spread out in a radius. Just now it is exceptionally bad in a crop planted in October last, and I think I shall lose nearly half of the potatoes. These were planted on land which has had one crop of potatoes taken off it before. The land was cleared lately. Manures used: bonedust, superphosphate, and lime.

"As I am planting a fresh crop in three weeks I would be glad if you could recommend anything. If the disease is a fungus, would it be of any use to sow some fungicide with the manures when planting? Of course, I am careful to use clean seed always, so far as I can judge."

To these inquiries the Department made the following replies, which will apply to other settlers troubled in a similar manner:—

"The samples of diseased potatoes have been examined by the Government Entomologist, and found to be affected with the potato-bacteriosis (*Bacillus solanacearum*). This disease attacks tomatoes and egg-plants as well as the potato. It first causes the foliage to wilt, individual plants in a field suddenly turning yellow and dying off. The disease is first introduced by planting infected sets, and is spread from these plants by means of cut-worms and other leaf-eating insects, which spread the infection by transmitting the bacillus from one plant to another. Diseased tubers can be easily discovered by cutting, when a discoloured ring will be noticed, which eventually causes the potato to rot. (*Vide* illustrations).

"Remedies.—All leaf-eating insects must be kept in check. For this purpose 4ozs. of Paris green added to every 40 gallons of Bordeaux mixture will be found an excellent check. All infected plants should, on first appearance of the disease, be cut down to the ground, to prevent the affection spreading to the tubers. If the seed planted was diseased this will be of no avail. In that case the whole plant and tubers should be dug up and destroyed by burning. Once the bacillus has gained an entry into the tissues of the potatoe-haulm, spraying, to save the plant so affected is of no use; the spraying must be directed against leaf-eating insects to prevent the spread from the diseased plant to the healthy. Potatoes or tomatoes should not be planted on ground previously infected; other crops should be grown for a period of at least twelve months. For directions as to the making of the Bordeaux mixture, see Spraying Calendar."

THE DIRECTOR OF AGRICULTURE.

Mr. Wm. Lowrie, M.A., B. Sc. (Edin), who has been appointed Director of Agriculture in this State, arrived by the R.M.S. "Omrah" on the 4th inst., and was met at Fremantle by the Minister for Agriculture (Hon. Jas. Mitchell), the Under Secretary (Mr. A. Despeissis), and Mr. J. A. Kinsella (Dairy Expert). Later in the day Mr. Lowrie visited the Department, and was taken through the offices by the Under Secretary, who introduced the new chief to the heads of the various branches.

Mr. Lowrie has gained a high reputation as an agricultural scientist, and has filled several important positions in the agricultural services of Australia and New Zealand. After receiving his early education in Scotland, where he graduated in arts and natural science, he was appointed Professor of Agriculture at Adelaide, S.A., where he inaugurated and successfully conducted the Roseworthy Agricultural College, which became a flourishing institution. This position he occupied for fourteen years, and about eight years ago he accepted the post of Director of the Lincoln Agricultural College in Canterbury, New Zealand, which under his control and energy gained recognition as a seat of agricultural knowledge, the benefit of which was felt by the farming community throughout the length and breadth of the Dominion. Although severing his connection with New Zealand with much regret, Professor Lowrie feels that in coming to Western Australia he will find a wider field for his attention, especially in the direction of establishing our primary agricultural and pastoral industries on a sound economic footing, and on which he intends to bring to bear the practical skill, technical knowledge and experience he possesses to such an eminent degree.

No doubt the great value of a Director with the trained mind and abilities of Mr. Lowrie will soon make itself apparent, to the gain of this rapidly growing Department and the State alike.

VISIT TO BRUNSWICK FARM.

The Director has visited the State Farm at Brunswick, and expresses his opinion of the state and work of the establishment in the following manner:—I was more than surprised to find at the Brunswick State Farm such a wealth of luxuriant and sound forage, of different varieties, produced upon the comparatively few acres which have as yet been reclaimed. The lucerne appeared to me, as far as one could gauge its value from its appearance and growth, to be little, if at all, behind the lucerne growth on the very valuable lands devoted to its cultivation in the vicinity of Adelaide. And it was almost equal to the growth on the sewage farm, where lucerne land lets for £10 per acre per annum rent, and where the lessee performs all the labour. There the sewage farm authorities merely turn on the water and guarantee a sufficient supply as required. One of the blocks at Brunswick was to be seen carrying its third crop since, I understand, last March, and that crop was well forward. Within a few weeks from now it will be ready for consumption, green, or for chaffing into the silo as a reserve of forage. So that in a little more than a year the fourth crop in succession may be upon that land. I consider that the

irrigation engineer has been very successful in working his scheme on such lines as will bring it within the means of every practical farmer. I may say that everything at Brunswick State farm seems to be upon an economical and thrifty basis, and cheaply carried out, and at the same time essentially good and useful. From my point of view such work as I saw had been carried out is more instructive and utilitarian than would have been a more elaborate and expensive engineering scheme, accompanied by concrete channels and other costly accessories. The farm buildings, too, I greatly liked. They are very good strong structures. There seems to be nothing which can be said to be extravagant, or which cannot be justifiably urged as an example to every farmer who aims at making his homestead substantial and trim, and at the same time efficient. Indeed, I may say that it was very encouraging to me to observe the satisfactory condition of affairs obtaining at the first of the State farms I have yet had the opportunity of visiting.

POULTRY NOTES.

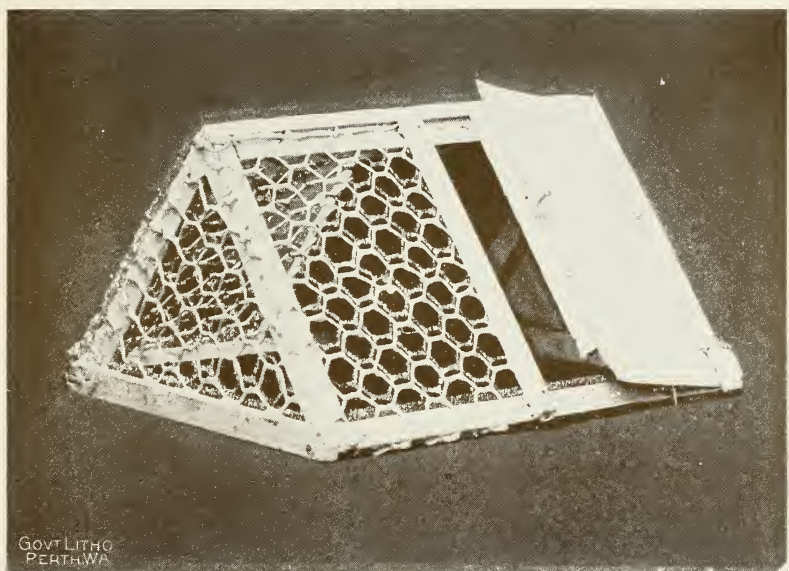
By FRANK H. ROBERTSON.

The Carriage of Poultry.

Farmers sending poultry to the markets are often put to considerable trouble in securing suitable crates for the purpose, and many persons are unaware of the provision made by the Railway Department in this respect. They provide very good wicker work crates which accommodate 12 pairs of fowls or ducks, or 8 pairs of turkeys or geese, at the following scale of charges, which includes the railage. Application for crates has to be made to the local station-master in whatever district they are required.

					s.	d.
Up to 50 miles	..	..	..	..	2	6
51 to 75 miles	..	..	..	..	3	6
76 to 100 miles	..	..	..	..	4	6
101 to 125 miles	..	..	..	..	5	0
126 to 150 miles	..	..	..	..	5	6
151 to 175 miles	..	..	..	..	6	0
176 to 200 miles	..	..	..	..	6	6
201 to 225 miles	..	..	..	..	7	0
226 to 250 miles	..	..	..	..	7	6
251 to 300 miles	..	..	..	..	8	0
301 to 350 miles	..	..	..	..	8	6
351 to 400 miles	..	..	..	..	9	0
401 to 450 miles	..	..	..	..	9	6
6d. per crate for every additional 50 miles or part thereof.						

These charges cannot be considered excessive. The crates are handy, and as they are not permitted to be overcrowded, the birds are more likely to



No. 1.—Moveable Coop.

arrive in better condition than if sent in the ordinary way, when the crates are too often badly constructed and too low to allow the birds to stand upright. They are also thoroughly disinfected and cleaned out by the Railway Department after each trip.

Feeding Fowls.

The popular belief in feeding fowls is that it is imperative that a warm mash should be given every morning and grain feed at night. I do not regard such as necessary; neither must the mash be given in the morning. The argument adduced in favour of the morning soft feed and night hard is that as grain is slower digested, the birds going to roost with a full crop have a food supply to carry them through the night and last them until the morning, when the mash food is given, thus keeping up their vitality. This no doubt answers well in the cold climates of the Old World, but here conditions are quite different, particularly in summer time when we want the system to be in a cool condition. Soft food is conducive to a feeling of repletion, resulting in a disinclination to activity, hence fowls fed heavily in this manner do not take sufficient exercise to keep their digestive organs in a healthy condition.

In the July issue of this *Journal*, when commenting on this subject, I mentioned that good results were obtained at Narrogin with soft feeding at evening. Since then, from recent experiences, I am convinced that mash feeding three or four times a week is quite sufficient, but there must be a good supply of animal food, and as much green stuff as the birds will consume; also vary the diet as much as possible. The staple foods are wheat, bran, and pollard. Let these be varied as much as possible by such as peas, oats, barley, and maize. Hereunder I give a menu for a week's feeding taken from the *Feathered World* (England), which gives a good idea of varied feeding for the months of September and October, which would correspond with April and May in this State:—

MENU FOR SEPTEMBER AND OCTOBER FOR EGG PRODUCTION. . .

For birds that are kept in confined earth runs.

Sunday.—Breakfast, 8 a.m., stout oats or white Canadian peas. Dinner, 1 p.m., meat scraps and cooked vegetables, such as cabbage, cauliflower, turnips or carrots, but not potatoes. Also green food each day. Last feed of day at 5.30 p.m. to be wheat, if oats given at breakfast time; but if peas are given for breakfast, then let the last feed be oats.

Monday.—Breakfast, soft food, either biscuit and meat meal and fine bran, scalded together and allowed to stand for a few minutes, then add sufficient middlings to make the whole crumbly. If biscuit and meat meal is not procurable, then use equal parts pea meal and fine bran, scalded, and dried off as above, and to this should be added a cupful of granulated meat or meat greaves to every four cupfuls of meal, and this meal should be scalded well with boiling water before adding it to the meat and before the latter is scalded. When this is done there will be no necessity to give cooked animal food at noon, and the same with biscuit and meat meal. Dinner, green food, such as cabbage leaves or cauliflower leaves, hung up in the run about 2ft. from the ground. Last feed, oats, wheat, or peas, alternate nights, but do not give mixed.

Tuesday.—As on Sunday.

Wednesday.—As on Monday.

Thursday.—As on Tuesday.

Friday and Saturday.—Soft food as on Monday, but should the weather be cold or wet add a handful or two of maize meal to the biscuit meal and bran before scalding, about half the quantity to that of the biscuit meal, and this must be allowed a little extra time to swell before adding the thirds or middlings.

When feeding with grain, this should be scattered amongst some litter in the scratching shed, which should be composed of dead leaves, cut straw chaff, etc., in order to give the birds plenty of exercise scratching amongst the litter for the grain, which is so highly beneficial to egg production.

Twice or thrice a week at this time of the year a little ovary tonic should be added to the drinking water, or a small piece of sulphate of iron, the size of a small bean to every pint and a half of drinking water, and this will ensure a better egg supply and will help to keep the birds in a good healthy condition.

For birds that have a good grass run

the same feeding can be adopted, but in place of wheat at night give a little maize two nights a week, and add a little more maize meal to the soft food, especially should the weather be cold or wet.

No animal food is required except what is given in the biscuit meal, as the birds during September and October will be able to find sufficient natural food.

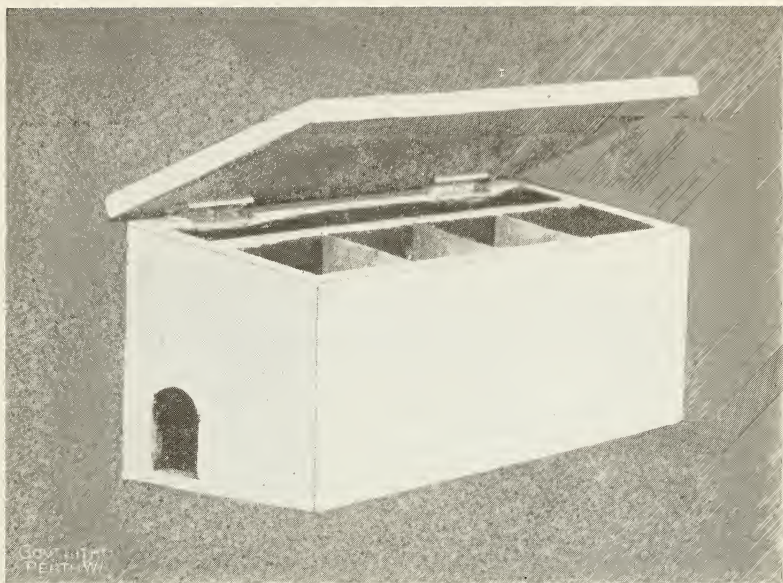
Note.—Maize, maize meal, and iron in the drinking water should not be given to white or light plumaged birds that are required for exhibition.

All the above-mentioned feeds are obtainable here with the exception of biscuit meal. We certainly can get peas and maize, but they are expensive: still I consider it pays to have them on hand to work in judiciously as change feeds.

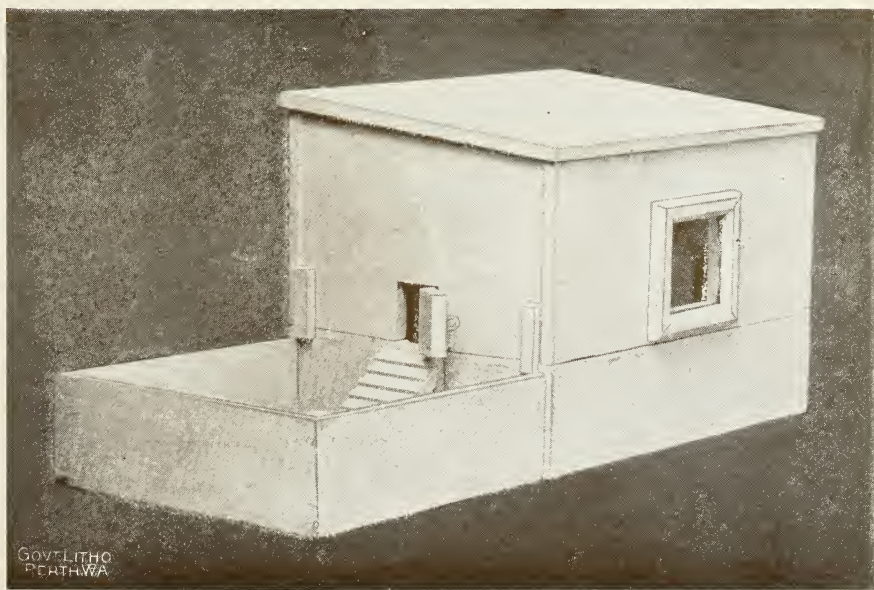
The supply of green stuff is a different problem in some localities, but by judicious management it can generally be overcome, the first crop to put in is rape, which should be sown just before the first rains come on, generally towards the end of March. This will give a supply of the best green fodder before other crops are fit to cut; after that green foods of all kinds are obtainable until the hot weather comes in, when maize is fit to cut; after that pig melons can be used, which will carry the poultry on until rape is available. Failing a supply of maize and melons, lucerne chaff is obtainable at about 10s. per cwt.

POULTRY APPLIANCES.

Illustration No. 1 shows a very handy form of movable coop which the writer used when at the Narrogin Farm; an ordinary tent-shaped frame is made, a handy size would be about 8ft. long, 6ft. of which is wire netted, the remaining 2ft. is made from a sheet of 6ft. corrugated iron; this is cut in half, making each side 3ft., the back is closed in with plain iron, and one of the sides is hinged and forms the door, which is far handier than having the door at the back. If the weather should be wet when the coop is occupied by hen and chickens, a wooden movable frame can be made to fill up the ground space which is under shelter. A sanded bag should be placed on the wooden floor and cleaned and replaced daily.



No. 2.—Nesting Box.



No. 3.—Brooder.

After the hen has left the chickens, this form of coop makes a good night shelter by fastening the door open sufficiently wide to allow chickens to run in and out. It is useful for many purposes, such as a pen for a sick bird, for fattening purposes, or as a temporary place to put a few birds that have just arrived or for birds that are to be sent away. The door at the side makes it easy work catching birds.

Illustration No. 2 is a very good nesting box for laying hens. There is a passage way running the full length of the coop, with an opening at each end for the hens to go in and out. There are four divisions, each separated by plain iron sheets fitted into a wooden frame. Both the iron and the frame are easily removable, so that they can be taken out and painted with kerosene, avenarius or other vermin destroyer. The top is hinged so as to allow the eggs to be collected. If the two entrances to the passage way are made just sufficiently large to admit a hen, it will keep the nests dark, and thus afford great protection against crows taking the eggs.

Illustration 3, 4, and 5 shows a simple, inexpensive, and effective home-made out-door brooder, in which the writer, during the past breeding season, reared 200 chickens in three lots without losing a chicken. A cheap way of making this brooder is to get a well-made packing case about $3\frac{1}{2}$ ft. square, and saw it into three sections. The first one, as per Illustration No. 5, shows the floor of the brooder, and is 10 inches from the ground to which it is open, then cut a circular hole in the floor about 6 inches in diameter, 12 inches from the end, into this space insert an iron cylinder, such as an ordinary billy-can, and tack it securely to the woodwork. A door is placed at the end, and the lamp rests on the ground directly under the centre of the cylinder. A proper brooder lamp should be used and protected by an iron chimney, with mica sheet in it, so that the lamp flame is easily visible. A small flame will be sufficient as the heat is concentrated in the cylinder. A little ventilation is required, this will probably be provided by the inequalities of the ground, or small openings in the woodwork. A piece of wire grating surrounds the cylinder to keep chickens off the hot metal. The cylinder is covered over with a wooden circular hover 20 inches in diameter, which rests on three iron legs 9 inches long, then cloth is tacked round the edge of the wooden part of the hover running to within half an inch of the floor, the cloth is cut half way up, and about 4 inches apart; a sack is laid over the floor, which is kept well sanded and cleaned out daily. The next section of the packing case, which is about 12 to 13 inches high, is lifted on to the brooder floor, and is kept in position by a cleat at each corner; the top cover is hinged and covered with a sheet of plain iron to make it watertight. It should also lap over about 3 inches all round to run the water clear of the walls. A small glass window is inserted in each side. Ventilation is provided by raising the lid according to the weather or age of the chickens. A temperature of 90 degrees for the first week is correct as registered by a thermometer running 5 inches through the top of the hover, 2 inches from the outer edge. A small door is made to allow exit and entrance of chickens to the brooder, provided with a slatted runaway; but for the first few days give the chickens a small raised platform to break them into running in and out of the brooder. Then remove the platform, and give them the run of the space enclosed by the third section of the packing case, and as the birds increase in size and strength the wooden run can be moved a few inches away to give them free run. In cold or wet weather the chicks can get good shelter if a sheet of iron is placed over the outside run.

When the chickens are old enough to do without artificial heat, they do very well in this machine as a cold brooder, and obtain good ventilation without draught by raising the lid.

The height of the lamp and chimney is Sin., the top of the chimney coming level with the floor of the brooder. It is advisable to use asbestos packing when tacking on the cylinder to prevent any chance of the wood becoming too heated. The brooder is made in two sections for handiness in removal.

THIRD EGG-LAYING COMPETITION AT SUBIACO.

[Commenced July 1, 1908. To close March 31, 1909.]

Appended, herewith, are the results for the competition which commenced on the 1st July and is to run for nine months, terminating on the 31st March, 1909.

Eggs for sitting from any of the pens are obtainable on application to the Manager at Subiaco; prices range from 10s. 6d. to 21s. per dozen. A price list is forwarded on application, or see the *Journal* for July.

The following are the results up to December 31:—

The figures in black indicate the winner of the monthly prize.

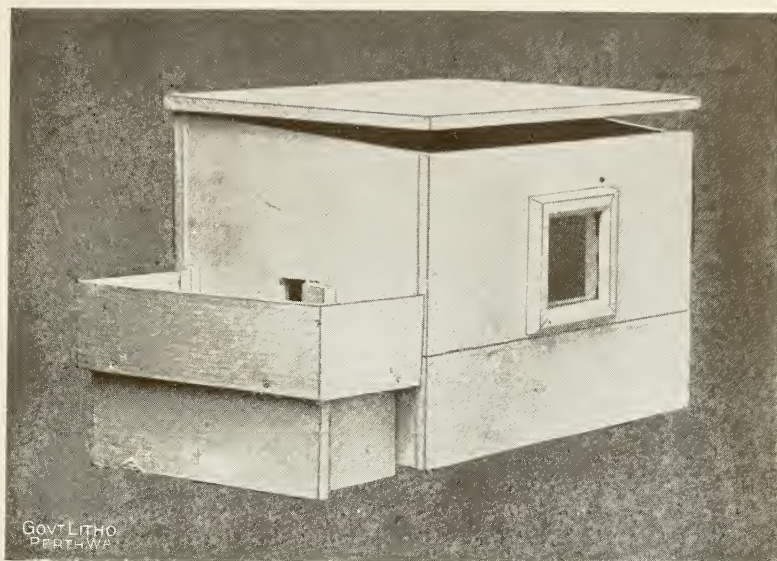
The first column of figures indicates the present position of the pens in the competition.

Pens marked thus * remained in from last competition.

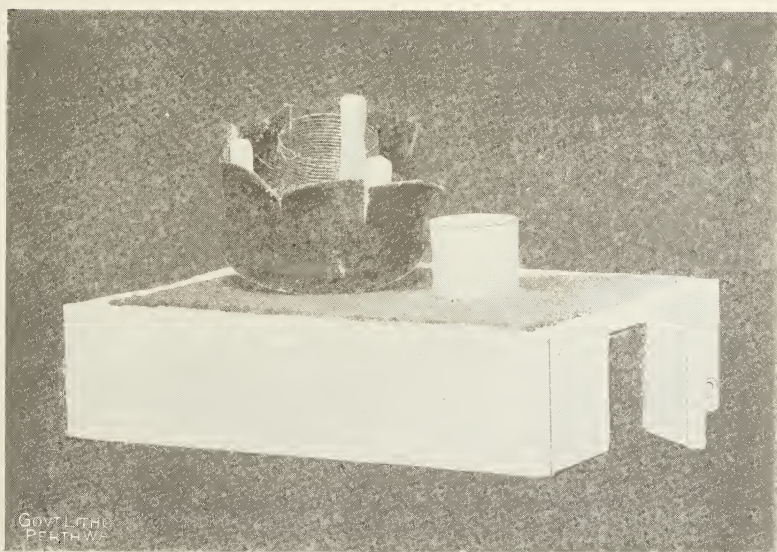
FOWLS.

Six females and one male bird in each pen.

Owner and Breed.		July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
1	Mrs. A. S. Craig, Black Orpington ...	131	145	129	146	110	117	778
2	S. Craig, White Leghorn ...	81	126	133	144	135	137	756
3	Mrs. C. F. Schmidt, White Leghorn ...	104	117	127	131	128	134	741
4	A. H. Padman (S.A.), White Leghorn ...	71	124	146	137	127	120	725
5	Gaffney & Bach, White Leghorn ...	102	117	128	136	113	125	721
6	Sunnyhurst (S.A.), White Leghorn ...	109	111	143	143	111	100	717
7	Mrs. A. E. Kinnear (S.A.), White Leghorn	82	110	136	140	121	112	701
8	Mrs. Kynaston, White Leghorn ...	91	130	122	139	108	104	694
9	C. Herbert, White Leghorn ...	86	129	133	129	91	106	674
10	Lionhurst Poultry Farm, Buff Leghorn ...	104	116	121	132	99	98	670
11	Mrs. L. Mellen, White Leghorn ...	106	126	133	128	92	83	668
12	Homebush Farm, White Leghorn...	80	107	118	135	121	102	663
13	T. W. Martin, White Leghorn ...	76	126	131	129	89	110	661
14	T. Ockerby, White Leghorn ...	62	126	116	129	111	115	669
15	Glendonald Poultry Yard, Silver Wyandotte	92	117	129	125	99	96	658
16	G. Bolger, White Leghorn ...	49	115	138	139	105	105	651
17	A. M. Thomas, White Leghorn ...	77	133	132	133	70	105	650
18	Greenville Poultry Farm, White Leghorn	97	114	127	118	87	106	649
19	J. W. Buttsworth, White Leghorn ...	113	133	117	113	78	91	645
20	C. B. Bertelsmier (S.A.), White Leghorn	94	125	121	121	82	100	643
21	Paddy King & Salter, White Leghorn ...	95	101	105	108	104	109	622
22	Shamrock Poultry Farm, White Leghorn	82	99	133	131	78	97	620
23	J. Gaffney, White Leghorn ...	83	106	119	112	102	98	620
24	E. Garbett, White Leghorn ...	71	129	120	120	85	88	613
25	W. Elliot, White Leghorn ...	89	109	109	114	88	103	612
26	Bon Accord Poultry Yard, White Leghorn	94	119	102	116	79	98	608
27	Mrs. Hobley, White Leghorn ...	87	118	111	110	80	91	597
28	Mrs. Flynn, White Leghorn ...	78	94	114	111	90	101	588
29	Mrs. Younger, White Leghorn ...	41	97	121	126	103	97	585
30	Greenville Poultry Farm, Silver Wyandotte	105	97	107	110	88	76	583
31	R. G. Flynn, White Leghorn ...	86	92	88	101	104	106	577
32	Coolgardie Poultry Farm, White Leghorn	66	97	110	112	96	92	573



No. 4.—Complete Brooder.



No. 5.—Brooder.

EGG-LAYING COMPETITION—continued.

FOWLS—continued.

Owner and Breed.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total
33 Ontario (S.A.) White Leghorn ...	72	82	106	140	75	94	569
34 O.K. Poultry Yards, White Leghorn ...	34	103	119	115	92	101	567
35 Honner and Forbes, R.C. White Leghorn	69	99	111	114	85	85	563
36 The Elms Poultry Yard, White Leghorn	51	92	111	124	96	86	560
37 Devine & Migro, White Leghorn ...	58	94	115	121	100	63	551
38 J. R. De Morrison, White Leghorn ...	61	104	108	105	82	90	550
39 *J. D. Wilson, Brown Leghorn ...	42	84	110	117	104	89	546
40 Craig Bros., Black Orpington ...	70	97	90	121	96	69	543
41 Mrs. Hughes, White Leghorn ...	57	92	126	116	75	73	539
42 *T. W. Martin (late O. James), White Leghorn ...	62	104	114	93	76	88	537
43 G. George, White Leghorn ...	66	96	103	106	85	79	535
44 *White Wings P.F. (No. 2), White Leghorn	71	93	103	111	63	85	526
45 A. E. Champness, White Leghorn ...	40	108	109	110	76	81	524
46 *Adelaide Poultry Yard, R.C. Brown Leghorn	62	99	106	96	74	84	521
47 South Perth Poultry Farm, R.C. White Leghorn	61	91	92	108	87	79	518
48 *J. Stuart, Golden Wyandotte ...	69	101	99	103	77	51	500
49 Mrs. McGree (No. 2), White Wyandotte	40	90	108	81	94	86	499
50 F. Whitfield, Minorca ...	57	71	89	122	83	76	498
51 Adelaide Poultry Farm, Buff Leghorn ...	33	82	104	106	87	85	497
52 T. Hickey, White Leghorn ...	0	84	130	102	64	99	479
53 *Mrs. McGree (No. 1), White Wyandotte	49	107	91	99	59	70	475
54 Hillview Poultry Farm, White Leghorn	51	92	83	89	81	79	475
55 *Craig Bros. (No. 1), White Leghorn ...	30	93	88	103	81	74	469
56 *White Wings Poultry Farm (No. 1), White Leghorn ...	52	65	80	96	85	75	453
57 *Mrs. H. M. Kelley, Gold Wyandotte ...	33	85	96	92	76	65	447
58 *J. Stuart, Silver-pencilled Wyandotte	33	74	101	94	77	60	439
59 *Mrs. H. M. Kelley, White Leghorn ...	23	68	106	104	60	61	422
60 Craig Bros. (S.A.) (No. 2), White Leghorn	49	81	90	88	61	49	418
61 J. Stuart, S.L. Wyandotte ...	57	72	83	62	79	58	411
62 R. L. Martin, Black Orpington ...	95	84	69	62	71	41	386
63 Craig Bros., White Orpington ...	57	73	60	67	48	54	359
64 J. Miller (late Dobson), Silver Wyandotte	34	59	40	38	36	34	241

Winner of first monthly prize, Mrs. A. S. Craig, Black Orpingtons, 131 eggs; second month, Mrs. A. S. Craig, 145 eggs; third month, A. H. Padman, White Leghorn, 146 eggs; fourth month, Mrs. Craig, Black Orpingtons, 146 eggs; fifth month, S. Craig, White Leghorns, 135 eggs; sixth month, S. Craig, White Leghorns, 137 eggs.

Winner of first three months test, Mrs. A. S. Craig, Black Orpingtons, 405 eggs.

Ducks.

Six ducks and one drake in each pen.

Owner and breed.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
1 F. Whitfield, Indian Runner ...	106	148	146	156	132	128	816
2*G. Thomson, Indian Runner ...	131	135	150	142	131	100	789
3 White Wings Poultry Farm, Buff ...	114	177	162	166	63	101	783
4 C. Phillips, Indian Runner ...	101	117	144	150	140	128	780
5 *Mrs. L. Mellen, Indian Runner ...	131	141	154	149	101	95	771
6 *Smith & Davenport, Indian Runner ...	116	128	136	154	125	99	758
7 D. F. Vincent, Indian Runner ...	119	132	133	177	123	64	748
8 J. Robertson, Indian Runner ...	32	108	179	143	139	119	720
9 H. Carr and Son, Indian Runner ...	142	137	136	118	95	72	700
10 *South Perth Poultry Farm (No. 2), Pekin	7	116	160	147	116	120	666
11 A. W. Edgar, Indian Runner ...	12	96	149	152	127	123	659
12 C. W. Johnston, Indian Runner ...	24	26	120	165	177	143	655
13 C. Geddes, Indian Runner ...	89	134	134	135	70	92	654
14 Bon Accord Poultry Yard, Buff ...	54	86	132	137	110	106	625
15 Mrs. R. B. Moyle, Indian Runner ...	132	127	92	113	84	74	622

EGG-LAYING COMPETITION—*continued.*DUCKS—*continued.*

Owner and Breed.		July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total
16	J. Moyle, Indian Runner	114	115	137	102	90	39	597
17	Adelaide Poultry Yard, Indian Runner ...	49	105	122	124	91	81	572
18	South Perth Poultry Farm (No. 1), Pekin	0	50	137	145	139	100	571
19	Greenville Poultry Farm, Indian Runner	68	85	140	128	47	98	566
20	*F. Whitfield (late Dusting), Indian Runner	72	48	108	128	127	71	554
21	Coolgardie Poultry Farm, Pekin	0	40	143	106	127	118	534
22	Simplex Incubator Factory, White Indian Runner	4	9	109	162	94	125	503

Winner of first monthly prize, H. Carr and Sons, Indian Runners, 142 eggs; second month, White Wings Poultry Farm, Buff Orpingtons, 177 eggs; third month, J. Robertson, Indian Runners, 179 eggs; fourth month, D. F. Vincent, Indian Runners, 177 eggs; fifth month, C. W. Johnson, Indian Runners, 177 eggs; sixth month, C. W. Johnson, I.R., 143 eggs.

Winner of first three months' test, White Wings Poultry Farm, Buff Orpingtons, 453 eggs.

SECOND YEAR'S TEST—FOWLS.

Owner and Breed.		July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
1	J. Stuart, Golden Wyandotte	69	101	99	103	77	51	1,900
2	Craig Bros.' No. 1, White Leghorn	30	93	88	103	81	74	1,764
3	J. D. Wilson, Brown Leghorn	42	84	110	117	104	89	1,671
4	Mrs. McGree, No. 1, White Wyandotte ...	49	107	91	99	59	70	1,663
5	T. W. Martin (late James), White Leghorn	62	104	114	93	76	88	1,612
6	Adelaide Poultry Yard, R.C. Brown Leghorn	62	99	106	96	74	84	1,570
7	Mrs. Kelley, Golden Wyandotte	33	85	96	92	76	65	1,566
8	J. Stuart, Silver-pencilled Wyandotte ...	33	74	101	94	77	60	1,364
9	White Wings Poultry Yard No. 1, White Leghorn	52	65	80	96	85	75	1,348
10	J. Miller (late Dobson), Silver Wyandotte	34	59	40	38	36	34	1,274
11	Mrs. Kelley, White Leghorn	23	68	106	104	60	61	1,232

SECOND YEAR'S TEST—DUCKS.

		First year.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
1	G. Thomson, Indian Runner	1,571	131	135	150	142	131	100	2,360
2	Smith and Davenport, Indian Runner	1,333	116	128	136	154	125	99	2,091
3	F. Whitfield (late Dusting), Indian Runner	1,493	72	48	108	128	127	77	2,047
4	Mrs. L. Mellen, Indian Runner	1,244	131	141	154	149	101	95	2,015
5	South Perth No. 2, Pekin	840	7	116	160	147	116	120	1,506

NOTICE TO SUBSCRIBERS.

Subscribers, whose subscriptions to the *Journal* terminate with the December number, are requested to forward to the Editor notice of renewal with amount of annual subscription (Five shillings) enclosed, or notice of discontinuance, as the case may be. The Editor reminds subscribers who omit to comply with this rule that they are liable to have their names removed from the subscribers' list.

EXHIBITION OF COLONIAL WINES.

Messrs. Dale, Reynolds, & Co., Ltd., of 46 Cannon street, London, E.C., held a competition for colonial wines on the occasion of the recent Brewers' Exhibition. The competition comprised 131 entries, and was regarded as a great success. Little or no intimation that the exhibition was being organised was received by the Department or others in this State, otherwise, with more publicity, there is no doubt there would have been a larger number of competitors from Western Australia. It will be seen from the list of awards that Messrs. F. & C. Piesse, of Katanning, were the only prize takers in this State.

The wine industry being one of importance to the productive progress of Western Australia, we value any legitimate encouragement for its promotion, and there is no doubt that exhibitions of the kind organised by Messrs. Dale, Reynolds, & Co. fulfil that purpose in a great measure.

The classification of the competition included hock, claret, and Burgundy types, full-bodied red, muscat character, and sparkling wines, and brandy from juice of grapes only. The next exhibition will be held in October of this year.

The subject being of such interest to our viticulturists and vigneronns we publish below the jurors' report and list of awards in respect to the exhibition under review, the gentlemen signing the report being well known in the wine trade of Great Britain.

JURORS' REPORT.

We, the undersigned members of the Wine Trade, requested by Messrs. Dale & Reynolds at the instance of the Agents General of the Colonies of New South Wales, Victoria, South Australia, and of West Australia, to examine the various samples of wines and of grape brandies sent to this country by growers of the aforesaid Colonies for inspection, have now the honour to submit our report.

The various exhibits were examined under conditions that entailed absolute freedom from bias of any description. Until the awards were made, the names of all exhibitors were absolutely unknown to the examiners. The examination was made under good conditions as to light, temperature, and freedom from any kind of interruption, none but persons engaged in the actual work being permitted in the room.

The samples submitted were of wines bottled in the Colonies, and drawn from existing stocks. Whether such stocks are of any importance, we have no means of knowing—we can only give our verdict on the samples submitted. The wines put before us varied considerably in the length of time they have been in bottle.

With the exception of certain wines to be particularised later, we found much cause of satisfaction and congratulation to our Colonial friends, on the great progress made during the last few years in the vinification, cellar treatment, and bottling of the Red Wines particularly. The condition of these was extremely satisfactory, and showed most emphatically that, given proper treatment and time (the very essence of that treatment), the wines of Australia are but little inferior to those of many of the good growths from the wine-producing districts of Europe.

We were particularly pleased with certain of the wines submitted from New South Wales. The quality evidently points in the first place to favourable site and soil and, secondly, to careful treatment. We were struck by the general absence of the unpleasant "terroir" so often observed in Australian Wines.

The White Wines of the Burgundy and Hock type were not so satisfactory, probably due to their condition, and we would suggest that careful attention should be paid to the selection and treatment of this class of wine. There were two or three notable exceptions calling for high commendation.

Class D. These are wines of a class not to be encouraged. They were of sweet mawkish flavour, sometimes found in certain European wines. With more careful treatment, these wines could be much improved, but we do not think would find much favour in this market.

Of Classes E and F we cannot for the greater part speak with much enthusiasm. There were a few exceptions, however, calling for high commendation, but even here faulty administration was apparent.

Nearly all the wines of Port style and Muscatelle and bad imitations of Sherry—of which we were sorry to see one or two—show that the art of making wines of these types is not yet perfect. The makers appear to be timid of the use of alcohol in making liqueur wines such as these are. Even in the old countries, wines unless carefully nursed and sustained when in wood by the administration of wine spirit at the proper moment, do not turn out well. Neither can it be expected that they should do so when made in the Colonies if similar precaution is neglected.

Of Class G, Sparkling wines, we cannot speak very highly, and think they could not compete with French wines of the same character. A better selection of the grapes would greatly improve the Colonial Sparkling wines. They require "lightening" by the addition of white grapes of the lighter and more acid variety.

Of the Sparkling Red Burgundies, we can only say the attempt shows great promise of what could be done with such excellent material.

Without a doubt the basis of all the wines exhibited is most excellent.

In Class H, Brandy, the Jury were much surprised with the quality of the samples submitted to their judgment, and there can be no doubt that, with care in the distillation, a great future is before the Colonies in this article, but the Jury would impress upon all concerned the absolute necessity of honest administration in this article.

There must be no mixing of Grain or Root spirit with wine spirit. The difficulty of analysis requires that excise regulations prohibiting mixing be strictly enforced.

WM. PHEYSEY, *Chairman*.

WM. G. MASTERS.

F. WEBSTER.

J. HUMPHRIES.

E. KOHTS.

A. E. HAMMOND.

Postscript.

The Committee would have been greatly pleased had it been possible to see Australian wines of recent growths, in wood, as that is the more satisfac-

tory guide to the general trader, and they hope that in ensuing years an opportunity may be given to the trade to examine wines fit for shipment to this country in wood.

WM. PHEYSEY, *Chairman.*

WM. G. MASTERS.

F. WEBSTER.

J. HUMPHRIES.

E. KOHTS.

A. E. HAMMOND.

Addendum note by the President of the Jury.

In 1867 when I first visited Victoria, I came to the conclusion that, after the industry of wool-growing, viticulture would be the second. I have never changed my opinion in spite of all the mistakes that have been made, and the experience gained by the small exhibition I have been so pleased to examine, only confirms my opinion forty years ago. The progress has been slow, very slow.

WM. PHEYSEY.

LIST OF AWARDS.

Class A.—White, Light Dry, Hock Type.

1st Prize.—Messrs. Jas. Angus & Sons, Rooty Hill, New South Wales.

2nd Prize.—Mr. C. F. Lindeman, Sydney, New South Wales.

3rd Prize.—Messrs. Hans Irvine & Co., Great Western Vineyards, Victoria.

H.C.—Messrs. Penfold & Co., Magill, South Australia.

Class B.—Red, Light Dry, Claret Type.

1st Prize.—Messrs. James Angus & Sons, Rooty Hill, New South Wales.

2nd Prize.—Messrs. Buring & Sobels, Adelaide South Australia.

3rd.—Victoria Associated Vineyards Co., Victoria.

H.C.—Messrs. F. & C. Piesse, Katanning, West Australia.

Class C.—Red, Full Bodied, Burgundy Type.

1st Prize.—Messrs. James Angus & Sons, Rooty Hill, New South Wales.

2nd Prize.—Messrs. Hans Irvine & Co., Great Western Vineyards, Victoria.

3rd Prize.—Mr. D. Mitchell, Gooramadda, Victoria.

Class D.—No Awards.

Class E.—Red, Full Bodied Sweet. Over 30 per cent. Alcohol.

1st Prize.—Messrs. Harbottle, Alsop & Co., Albury, New South Wales.

2nd Prize.—Mr. C. F. Lindeman, Sydney, New South Wales.

3rd Prize (equal).—Messrs. F. & C. Piesse, Katanning, West Australia; Messrs. B. Seppelt & Sons, Ltd., Seppeltsfield, South Australia.

Class F.—Muscat Character Wine. Not more than 30 per cent. Alcohol.

1st Prize.—Messrs. Penfold & Co., Magill, South Australia.

2nd Prize.—Messrs. B. Seppelt & Sons, Ltd., Seppeltsfield, South Australia.

3rd Prize.—Messrs. S. Smith & Son, Angaston, South Australia.

Equal, H.C.—“Auldana,” Ltd., Magill, South Australia ; Stoneyfell Vineyards Proprietary, Adelaide, South Australia.

Class G.—Sparkling Wine of any character with Natural Effervescence only.

2nd Prize. (Only Award.) Messrs. Jas. Angus & Sons, Rooty Hill, New South Wales.

Class H.—Brandy. made from the juice of Grapes only.

1st Prize.—Messrs. Tolley, Scott & Tolley, Adelaide, South Australia.

2nd Prize.—Messrs. Horn & Co., “Horndale,” Happy Valley, South Australia.

3rd Prize.—Messrs. B. Seppelt & Sons, Ltd., Seppeltsfield, South Australia.

RECIPES.

Worms in Pigs.—The most satisfactory remedy is the santonine and tartar emetic worm-powder. For adult pigs, as much as will go on sixpence, and for young animals half that quantity. Measure out sufficient for all the pigs, and mix it thoroughly with the food.

Lice on Pigs.—The following is an excellent plan to adopt for this trouble:—“Make an open box, watertight, of 2in. timber, place it near the pump or water supply, and keep it one-third or one-half full of water, adding enough of any reliable sheep dip to kill the vermin. Give the pigs free access to the bath, and you will have no further trouble with lice or any skin disease. The pigs will wallow in this daily for a few minutes and then hunt the shade. To prevent mud wallows near the bath the floors should be extended or paved with stones for several feet round the bath. No attention need be given to their sleeping in infested places, as every louse that gets on the hog to-day is killed to-morrow, so the place will soon be rid of all such vermin.”

Ringworm in Cattle.—Sometimes attacking horses, dogs, and cats. A skin fungus or parasite (*Trichophyton tonsurans*). A mild and effective remedy is:—

(a.) Lard, 5 parts, Iod., 1 part.

(b.) Softsoap, 5 parts; sulph., 1 part.

(c.) Glycerine, 38 parts; sulphuric acid, 1 part.

(d.) Glycerine, 3 parts; acetic acid, 1 part.

The ointment should be well rubbed in and the parts always washed before a second application. The disease is contagious, and walls, fences, posts, woodwork and floors are easily contaminated, and may remain a source of contagion and trouble for months unless effective cleansing measures are thoroughly carried out.

AGRICULTURAL BANK.

ANNUAL REPORT.

The Hon. the Minister for Agriculture.

The Agricultural Bank,
Perth, 1st October, 1908.

Sir.—

In conformity with the provisions of the Agricultural Bank Act, 1906, we have the honour to forward you our report on the operations of the Agricultural Bank for the financial year 1907-8, with balance sheet as at 30th June last.

We held during the year 38 board meetings dealing with 2,471 applications, aggregating £354,660. The loans authorised numbered 2,347, involving a sum of £310,585; of these eighteen applications, representing a sum of £1,885, were subsequently cancelled at the applicants' request, leaving a net capital appropriation of £308,700. One hundred and twenty-four applications, amounting to £16,075, were declined in full.

The purposes for which the amount authorised is to be used are as follows :—

	£	s.	d.	£	s.	d.
To Pay liabilities .. .. .	..	..	..	12,279	17	6 *
„ Purchase breeding stock .. ..	..	..	..	32,030	6	0
„ Carry out improvements as under—						
Clearing .. 141,061 acres costing	168,487	17	0	} 264,389	16	6
Ringbarking.. 253,157 „ „	19,121	18	11			
Poison and black-						
boy grubbing 43,488 „ „	5,700	5	6			
Fencing .. 322,963 chains „	95,542	12	4			
Draining .. 3,208 „ „	1,258	8	4			
Water supply	19,244	14	2			
	£309,355	16	3	£308,700	0	0

The amount actually advanced during the year was £218,420 17s. 6d., making with amount previously advanced a total disbursement of £743,598 14s. 1d.; the repayments during the same period amounted to £28,753 11s. 11d., making the total amount repaid £133,396 11s. 6d., and leaving a balance outstanding on June 30th, 1908, of £610,202 2s. 7d.

The amount advanced has been applied, as prescribed by the 1906 and previous Acts, to the following purposes:—

	For year ended 30th June, 1908.			Total amount to date.		
	£	s.	d.	£	s.	d.
Liabilities taken over	9,988	0	0	42,144	0	0
For purchase of stock	27,795	0	0	71,995	0	0
„ „ plant .. ..	..	..	..	6,494	0	0
„ „ fertilisers	30	0	0	3,278	0	0
For developmental purposes..	180,607	17	6	619,687	14	1
	£218,420	17	6	£743,598	14	1

The improvements effected by farmers with the assistance of the Bank's funds are as follows:—

	Year ended 30th June, 1908.		Total to date.	
Clearing ...	102,128 acres costing	£130,870 ...	378,094 acres costing	£643,341
Cultivating ...	23,966 " "	12,100 ...	205,973 " "	116,367
Ringbarking ...	175,208 " "	17,518 ...	455,457 " "	44,363
Fencing ...	175,896 chains	52,139 ...	338,493 chains	98,663
Draining ...	" " "	854 ...	" " "	4,127
Water Supply ...	" " "	13,173 ...	" " "	34,789
Buildings ...	" " "	2,372 ...	" " "	82,325
Orchard ...	" " "	" " "	321 acres	4,321

The profit account shows a credit balance for the year of £4,637 ls. 7d. The cost of inspection and valuation of securities shows, as anticipated, an increase in comparison with the previous year of £1,565 14s. 10d. Provision will be required on the current year's estimates for a further increase in this direction. The constantly expanding area of our operations, superadded to the necessity for closer supervision in regard to the large number of inexperienced farmers, renders further additions to the staff necessary. Progress payments are made on the certificates of approved neighbouring land holders. This work, if undertaken by the Bank, would entail the employment of a large number of additional inspectors. To detect and guard against any imposition which this method exposes us to, our Inspectors are continually making check inspections synchronously with current work. Over 1,100 reports of this nature were dealt with during the year, with very satisfactory results, as only in one instance was it deemed necessary to call in the advance. With an increased staff it is intended to have this work systematically and rigorously carried out, both in respect to improvements in progress and their subsequent proper maintenance.

We found it necessary to take more commodious offices, involving an expenditure on fittings and furniture of £239 18s. 5d., which has been provided out of revenue. We experienced some difficulty in securing suitable premises, and in view of contemplated additions to the staff, in order to have the conveyancing done by the Bank's officers, the trouble is only temporarily allayed.

We regret having found it necessary, as the result of misappropriation, to write off the sum of £94 6s. 11d., being the first loss in this respect made by the Bank.

We received demands for assistance from certain settlers on the Stirling re-purchased estate, and on the Nangeenan and Hamel special settlements, and in view of the heavy existing liability to the Crown on these lands we did not deem it prudent to make the advances asked for. On representing the position to the Government, an order in Council was made indemnifying the Bank against any loss arising from loans made on these securities. The amount advanced under this guarantee to June 30 was £2,943 2s. 6d.

It might be mentioned that although all mortgage bonds are issued by the Treasurer and their due payment secured upon the consolidated revenue fund, the Act invests the Bank with an individual trading entity, and although in an ultimate analysis the indemnity loses significance, the immediate purport is to divert the incidence of any loss in respect to these advances from the Bank's reserves to the consolidated revenue fund.

We took possession of one property during the year, which was subsequently sold, the amount realised fully meeting all claims. In this respect we anticipate an increasing number of small holdings, principally homestead farms, falling into our hands but from the inquiry coming to hand we do not expect much serious trouble.

This question of small holdings, the outcome generally of inexperience or lack of capital, has reached a stage at which we feel warranted in making some definite recommendation. We would like to see the system of land settlement revised, so as to protect at the outset the inexperienced selector against his lack of knowledge. The Bank, following in the wake of selection, is now operating principally in the wheat belt, on lands distantly located and at times of mixed quality, and we are of opinion that under no circumstances should a settler be given lesser area than 640 acres of this country. The difficulty confronting the small man could, we think, be met by a suspension of rent during the initial period, but the heavier outlay in this direction would to a considerable extent, be offset by the more liberal aid which the Bank would be justified in rendering. It appears to us very desirable that every settler should be placed on an area adequate to ensure his ultimate success, and to do this a standard area of wheat or sheep country should be adopted which, according to quality in these areas, should range from 640 to 1,000 acres.

The bulk of settlement must continue to eventuate in this class of country, and we deem it a better policy to establish a smaller number of settlers on farms of a profitable area than to continue the present method of allowing persons to select areas so restricted as to be incapable of profitable development. To give a fuller measure of help in the development of properties of the area suggested, the limit to be advanced by the Bank would need to be increased to £1,000, with greater provision for stock, and for the purchase of implements of local manufacture; the present Act retiring from the farmers' aid at a period too early in the development of his property.

Considerable irritation has recently arisen, through the lack of uniformity between the Lands Department valuations and our own. To guard against a continuance of this it is proposed in future to have all new areas valued by our officers, before they are thrown open for selection. This will, in addition, greatly facilitate our subsequent transactions in respect to these areas.

The gradual growth of a reserve now amounting to £18,194 7s. 5d. is a cause of satisfaction. Our aim has been to harmonise a due regard for the public funds with the furtherance of the proclaimed policy of the Government. We recognise that owing to the difficulty in regard to transport somewhat greater risks will have to be accepted in the newer areas than was necessary in the past, but we are confident that if our suggestions are given effect to the Bank will continue to achieve an increasing measure of success as a powerful factor in the settlement of the waste lands of the State.

A. R. RICHARDSON, Trustee.

JOHN M. HOPKINS, Trustee.

A. McLARTY, Deputy Manager.

21st November, 1908.

ACT No. 15 OF 1906.

Balance Sheet of the Agricultural Bank of Western Australia as on 30th June, 1908.

LIABILITIES.							
	£	s.	d.	£	s.	d.	£ s. d.
Capital authorised ...	£1,500,000						
Mortgage Bonds current, 30th June, 1907, bearing interest at 3½ per cent.	233,600	0	0				
Mortgage Bonds current, 30th June, 1907, bearing interest at 3½ per cent.	199,500	0	0				
				433,100	0	0	
Mortgage Bonds issued during year at 3½ per cent. ...				217,500	0	0	
				650,600	0	0	
Less redeemed during year at 3½ per cent. ...				35,000	0	0	
Total Mortgage Bonds current ...							615,600 0 0
Treasury: Advances against borrowers							
—Unpaid interest ...				14,698	3	4	
Less balance on current account ...				4,634	5	10	
							10,063 17 6
Sundry creditors ...							28 14 4
Debit balance at Bank ...							1,068 14 1
Prepaid charges ...							146 12 0
Reserve—Profits employed to redeem mortgage bonds under Statute ...							13,557 5 10
Balance—Profit for year ended 30th June, 1908 ...							4,637 1 7
							£645,102 5 4
ASSETS.							
	£	s.	d.	£	s.	d.	£ s. d.
Loans outstanding, 30th June, 1907 ...	420,534	17	0				
Loans made during year ...	218,420	17	6				
				638,955	14	6	
Less repaid during year ...				28,753	11	11	
Total Loans outstanding ...							610,202 2 7
Treasury Redemption Account:—							
Invested at fixed deposit at 3 per cent. ...				15,000	0	0	
Uninvested ...				4,894	2	10	
							19,894 2 10
Sundry Debtors:—							
Borrowers' interest outstanding ...							14,698 3 4
Cash in hand ...							307 16 7
							£645,102 5 4

For the Agricultural Bank of Western Australia,

A. McLARTY,
Deputy Manager.

In accordance with Section 40 of the Agricultural Bank Act (6 Edward VII, No. 15), the foregoing Accounts and Balance Sheet have been examined under me directions, and I certify that they are in accordance with the books and documents produced, and properly drawn up so as to present a true and correct view of the transactions for the period under review, subject to my report of even date.

C. S. TOPPIN,
Auditor General.

4th November, 1908.

Profit and Loss Account for Year ended 30th June, 1908.

CR.

Appropriation Account.

For the Agricultural Bank of Western Australia,

A. McLARTY,
Deputy Manager.

These are the Accounts referred to in the Certificate on the Balance Sheet attached.

C. S. TOPPIN,
Auditor General.

4th November, 1908.

Borrowers' Appropriation Account.

DR.	£	s.	d.	£	s.	d.
Loans Authorised	1,062,515	0	0			
Less Balances cancelled	44,031	5	0			
				1,018,483	15	0
				£1,018,483	15	0

(Sections 28 and 29.)

CR.	£	s.	d.
Instalments paid	£743,598	14	1
Balance—Loans authorised, but not yet made	274,885	0	11
	£1,018,483	15	0

Treasury Authorisation Account.

DR.	£	s.	d.
Capital provided by Statute	£1,500,000	0	0
	£1,500,000	0	0

(Section 16.)

CR.	£	s.	d.	£	s.	d.
Total Loans made	£743,598	14	1			
Borrowers' appropriation for existing contracts ..	274,885	0	11			
				1,018,483	15	0
Balance—Amount available for further loans ..				481,516	5	0
				£1,500,000	0	0

For the Agricultural Bank of Western Australia.

A. McLARTY,

Deputy Manager.

Statement of Applications received during Year ended 30th June, 1908.

	Number.	Amount applied for
		£
Dealt with	1,973	280,660
Withdrawn before inspection ..	35	5,550
Pending Inspection	590	82,500
Total	2,598	368,710



Summer Time in Western Australia.

Statement of Applications dealt with, including 498 carried over from previous year.

	Number.	Amount approved.	Amount declined.	Amount cancelled.
Approved wholly or in part	2,329	£ 308,700	£ ..	£ ..
Moiety declined .. .. .	..	..	28,000	..
Declined in full	124	..	16,075	..
Cancelled at request of Applicants ..	18	..	..	1,885
	2,471	308,700	44,075	1,885

BULLETINS ISSUED BY THE DEPARTMENT OF AGRICULTURE.

Settler's Guide, 2nd, 3rd, 4th and 5th editions.

Handbook of Horticulture and Viticulture (A. Despeissis). 2s. 6d. and 1s.

New Dairying ("Agricola").

Production of Lucerne.

Diseases of Honey Bees (John Sutton).

What can be done by the Beginner on the Soil (Hon. James Mitchell, Minister for Agriculture).

Stack Silos (A. Despeissis).

Report of Proceedings of Conference of Producers, 1907.

The Diseases of Animals and Meat Inspection (J. Burton Cleland, M.D., Ch. M., Syd.).

Factory Dairying (J. A. Kinsella).

Vegetable Growing (G. Chitty Baker).

Examination of the W.A. Poison Plants (E. A. Mann).

Care and Treatment of Milk and Cream (J. A. Kinsella).

Hints to Stock-breeders (Weir).

Meat Inspection and Diseases of Animals (J. B. Cleland, M.D.).

Poultry, Care and Management of (F. H. Robertson).

Potato Culture (T. J. Wallas).

Back volumes *Journal of Agriculture*.

Tobacco Cultivation (H. Allerton Cowper).

Cotton-growing (H. Allerton Cowper).

Dingo Trapping.

The New Sun-Dial (W. E. Cooke).

The Silo on the Farm (J. A. Kinsella).

Conference of Producers, 1908—Report of Proceedings.

Free copies of such publications as have no prices attached can be obtained on application.

THE DEADLY HOUSE-FLY.

CARRIERS OF DISEASE.

At the annual conference of the Sanitary Inspectors' Association, held in Liverpool during September last, the President, Sir J. Crichton-Browne, delivered the following address, which should be read with interest by our local authorities, who are confronted by the same problem here:—

Sir James Crichton-Browne devoted the presidential address largely to the subject of disease carriers. It might sound chimerical, he said, to talk of the abolition of a disease, but that was what they must aim at; the abolition first of one disease then of another, until they had a clean bill of health. The Liverpool School of Tropical Medicine had in a decade added more to the knowledge of tropical diseases than all the preceding centuries. It might be safely predicted that if the researches being carried on at that school and the sister school in London were adequately supported, some tropical diseases—grievous scourges—would before long be effectually controlled or abolished. They had had only the other day a striking example of the practical abolition of a disease in the case of Malta fever.

At considerable length Sir James Crichton-Browne dealt with

some of the causes of consumption.

contending that the sharp distinction formerly drawn between the human and bovine tubercle bacilli had broken down. Accumulated evidence left no doubt as to the practical identity of bovine and human tubercle bacilli. They were the same organism—modified simply by change of host, the bovine being gradually transformed into the human in and by its human environment. The bearing of this was that they must have greatly increased stringency in supervision. The danger attending the consumption of the milk of tuberculous cows was being illustrated daily by striking example. The summary slaughter of animals proved to be infected should enable us to stamp out bovine tuberculosis in a comparatively short time, and thus cut off the main source of human infection. On all hands the signs were favourable for the subjugation of this disease, for new methods of treatment were securing a greatly increased rate of recovery in those who had actually contracted it.

Perils in the House.

Fortunately, in this country they ran practically no risks from suetorial insects injecting disease-causing organisms, but they had insects that indirectly and mechanically smuggled disease about. The common house-fly had been alleged to be implicated in this flagitious traffic. Six years ago, when addressing them at Middlesborough, he denounced *Musca domestica*, and expressed his belief that it was a disease-carrier, and although some medical officers of health and others were still sceptical on the point, the evidence that had since then accumulated seemed to leave no doubt about it. Dr. Jackson, of New York, had found as many as 100,000 faecal bacteria on the legs, body, and mouth of one fly, and had shown that in that city there was an exact corres-

pondence between the prevalence of flies and the mortality from diarrhœal diseases. "This so-called innocent insect," said Dr. Jackson, "is one of the chief sources of that infection which, in New York City, causes annually about 650 deaths from typhoid fever, and about 7,000 deaths from other intestinal diseases."

Professor Nuttall has shown that flies were

capable of carrying the plague bacillus.

Celli had established that they could carry tubercle bacilli. Many other observers had found adhering to their appendages pathogenic bacteria of several different sorts. Could it be questioned that they could pick up from typhoid cases the bacillus typhosus, and carry it to the milk-jug where it would find a suitable culture medium? Could it be questioned that in their summer flittings to and fro they were instrumental in spiriting about and landing in milk or in sugar, or on cake or other comestibles, the specific cause of summer diarrhœa, the bane of the babies, which was not yet identified, but was assuredly one or more micro-organisms?

Liverpool was again to the front in this matter. The City Council made a grant to the School of Tropical Medicine to investigate the fly problem further, and had now taken action in accordance with the recommendations of the School, and was clearing away the breeding places of the fly. Already this wise policy had borne good fruit in a notable reduction of the amount of summer diarrhœa. The Local Government Board had just taken up the matter, and its President had, with his usual clear sanitary insight, appointed a departmental committee to inquire into the part played by flies in the spread of disease. No scientific jury with the evidence at this moment available before it would hesitate to find the fly guilty as a carrier of disease. Lives were at stake, and they could not be too prompt in going to the rescue.

Fight with the House-fly.

The fly was a danger signal. Wherever flies congregated there must be dirt about. Even if the fly should be proved to be grossly maligned, the removal of that dirt must be advantageous. The practical proceedings which a study of the fly's life history suggested were the removal of all horse manure and similar products as speedily as possible and certainly within eight days, the time occupied by the development of the fly, the substitution of water carriage for the older methods that were practicable, the frequent clearance and cleansing of streets and courts, the employment of destructors of sufficient capacity to deal with the house refuse as it was collected, the re-constitution of the domestic larder which should be made fly-proof, and kept as scrupulously clean as the operating theatre of a hospital. They would, perhaps, have refrigerating larders one of these days.

No doubt the fight with the fly would be a stiff one. One fly, it had been calculated, would lay 1,000 eggs, and might, on the snowball principle, have 25,000,000 descendants in a season. It was only by systematic attacks on the breeding places that they could hope to rout this multitudinous disease-carrier.

Other Disease Carriers.

But, besides insects, many other animals were disease carriers. Oysters and cockles had been detected in the surreptitious conveyance of typhoid

fever, and cats were shrewdly suspected of the clandestine delivery of diphtheria. It would be interesting to enumerate and classify all the known animal carriers of the disease, and to say a word or two about human carriers. And when he mentioned human carriers he did not refer to contagion, or the direct transference of *materies morbi*, by a diseased to a sound person by touch, inoculation, kissing, or inhalation, or to infection or the indirect communication of a pathogenic organism from a diseased to a sound person through some intervening medium, such as the air, but to the transmission of a pathogenic organism from a sound person in whom its presence was unsuspected to another sound person in whom it set up its specific disease.

OSTRICH FARMING.

A South African correspondent of the *Pastoralists' Review* says:—

"The wealthy men are those engaged in ostrich farming, which industry is the only one still booming. The value of the feathers exported is very close to that of wool, and prime whites realise up to £50 a lb. The leading breeders devote their energies to the improvement of quality, the desiderata being width of feather, density of flue, and lightness of quill. One thousand pounds has been paid for a pair of breeding birds, and £100 for young cocks is frequently given. All the best birds are run in lucerne paddocks, or fed on lucerne hay, and on coast farms rape is also largely grown for them. One charming aspect of the industry is that the ostrich farmer can stow his clip into his buggy, drive with it into town, and bring away more money than the owner of two or three waggon loads of wool."

This induced us to make inquiries as to the latest experience with ostrich farming in Australia, and obtain information in regard to the prospects of establishing the industry here on a larger scale. The first result of our inquiry is the following letter from owners of ostriches in New South Wales. They state:—

"The industry from our experience is peculiarly suitable to this country, and there is no reason that we can see why Australia should not produce every bit as good feathers as South Africa or any other country, provided a little care and discrimination are exercised in selecting the breeding birds. The birds do not do so well in a moist atmosphere (we would not recommend them for a district with more than a 22in. rainfall), but at the same time require a certain amount of green food, and of all green food we find clover and lucerne to be the best for them, but they will eat almost any herbage when green, and they always prefer herbage to grass. The old birds are very hardy, and we do not know of one dying from old age. Death is almost invariably due to accidents. They do not deteriorate with age as far as their feather production goes, provided the feathers are taken in the proper manner. It is also considered that the older the bird the better nester he becomes.

"The birds require very little attention provided they are put in secure paddocks. An ordinary six-wire fence 4ft. high will hold them if the panels are not too long and the wires kept tight.

"Birds should be mustered and put through the yards at least once a month, or whenever their feathers are ready to take. The feathers should not be left on overtime, as the tips get spoilt and half the value of the feather is consequently lost.

"To secure the success of ostrich farming one must be able to rear the chicks successfully. This is very difficult in a cold, wet climate, as chicks will not stand a lot of wet weather. They like a dry, hot climate, but they must have unlimited green feed as well. Consequently one must be able to grow lucerne, by irrigation if necessary, but by some means. The main season for laying is from August till new year, though birds will lay as early as April and as late as February. When nesting the birds get very savage, fight among themselves, and will attack any person. This, as far as we can see, is the greatest objection to the industry, as people who do not understand the birds are naturally afraid of them, though a little experience and a forked stick for defence make it perfectly easy to go anywhere among any savage birds. When savage they are very easily aggravated, especially by people not used to them. They can kick quite hard enough to break a man's leg, or a horse's leg if you are riding, but they take no notice of other stock—horses, cattle, or sheep running in same paddocks. When one considers that the value of the shipments of feathers from South Africa is about £2,000,000 yearly, and the price that their stud birds fetch over there—£400 was paid last July for a two-year-old cock, and more has frequently been paid for other birds—one can only conclude that there must be a great deal in the industry, particularly as the demand for feathers exceeds the supply, and is increasing. The industry has only been in existence about forty odd years, as before that the wild birds were killed for their feathers. We notice that since we brought the birds to this district the quality of their feathers has distinctly improved, showing that feed makes feather just as it does wool. By careful breeding we hope to still further improve our quality of feather.

"P.S.—There is no disease known among ostriches in Australia so far, though there are one or two in South Africa."

"DIE-BACK" AT BRIDGETOWN.

Referring to the account in the *July Journal* of the presence of "Die-back" in a Bridgetown orchard, Mr. W. W. Wickens, Inspector of Orchards, reports that he has since visited the orchard mentioned, and is of opinion that the disease is not caused through the inability of the roots to penetrate downwards, the subsoil (gravel) being equally as friable as the surface soil. He noticed two young apple trees had become affected, although planted only last season and in a different situation and soil to where the bulk of the affected trees are growing, which leads to the belief that the disease was either in the tree itself at the time of its removal from the nursery, or had been brought about by the use of infected pruning tools in the orchard. Out of several hundred young trees planted last season only the two above mentioned show any signs of the disease.

HORSE-BREEDING FOR INDIA.

R. E. WEIR, V.S., Chief Inspector of Stock.

The report submitted by Colonel Howard Hoad, C.I.S., to the Indian Government, as the result of his visit to the various States of the Commonwealth and New Zealand, in connection with the future prospects of procuring remounts for India, is both valuable and instructive reading.

Commenting upon the position held by the various States in this direction, he pertinently puts down the supply as "Nil." This, unfortunately, is our unenviable position at the present moment, but needless to state, is unlikely to continue for any lengthened period, as the possibilities of producing remounts in this State are equally as good as in any other part of the Commonwealth, and in addition, we have a considerable advantage from our State's geographical position. Our climate is all that can be desired for the building up of a strong constituted animal, and the natural soil and herbage conditions over the greater proportions of the State are in every way suitable for the promotion of such an industry. Some parts, more particularly the Murchison and Eastern Goldfields, are especially favoured in this direction. Horses bred in the districts mentioned thrive remarkably well, and evidently obtain the necessary supply of lime salts, which is so necessary for the building up of a strong framework of bone formation.

The survey of the Transeontinental Railway route has recently furnished us with an additional large tract of country, which, in the opinion of the officers who completed the work, is thoroughly adapted for this particular industry. Over 19,000,000 acres of land are here available, and the grasses, chiefly millet and speargrass, are known to be particularly nutritious and especially suitable for horses. The only drawback is the scarcity of water supply, though this can easily be remedied by an extension of the present system of boring, which may safely be relied upon to produce all the necessary requirements in that direction. Land of this character is obtainable from the Government at very reasonable rates, and anyone procuring a holding will be enabled to compete on the most favourable terms with the Eastern States.

It will thus be seen that, with the exception of possibly the Kimberleys, where the herbage is of a coarse character, the whole of the State is thoroughly adapted for horse-breeding, and instead of only having a little over 100,000 head of horses in this State, the number should be increased tenfold. With so much in our favour there is no reason why, with a little additional energy, perseverance, and intelligence, some small quantity of the Indian horse-trade should not be almost immediately diverted to ourselves. Once the industry has been established, it will—like the proverbial rose—continue to flourish for all time. To show the value of this trade at the present moment, according to Colonel Hoad's calculation, the monetary value is about £200,000, and this appears to be increasing from year to year, the average price per head having risen from about £8 in the early days to about £25 at the present time.

As a means of placing the industry on a more sure foundation, Colonel Hoad has recommended the purchasing of future consignments direct from the breeder. In the event of this system being adopted, it will mean a greater

degree of security to the producer by reason of ensuring a fixed and payable price on all sales. In addition, the usual expenses incurred in sending the same stock to market will also be saved. All that is required from the breeder is to have thoroughly suitable animals placed under offer, and that they should be free from any unsoundness.

Those who purpose initiating the industry should, after procuring the necessary country, purchase young mares, about three years old if possible, and mate them to a strong-boned, thorough-bred sire.

The class of mares most suitable for the purpose are strongly built and roomy half-breds, free from any hereditary unsoundness. They should be uniform animals, so as if possible to produce an even class of progeny, which will be found more marketable at time of sale.

The best sire for getting remounts is undoubtedly the thoroughbred, and every effort should be made to procure a thick-set, heavy-boned horse. In our dry Australian climate the inclination is for the progeny to grow up light in build, and to counteract this disposition the sire should, if possible, be on the heavy side. It is here that some assistance could be rendered the settler by the Government annually importing suitable sires from Great Britain. The systematic fusion of fresh blood would be the means of keeping up the standard, and in a very few years this State would be in a position to export a good proportion of remounts which would undoubtedly bring us both credit and renown.

TO COPE WITH HOUSE FLIES.

A contemporary furnishes the following simple expedients for destroying house flies:—

1. They may be effectually destroyed by putting half a spoonful of black pepper in powder, on a teaspoonful of brown sugar, and one teaspoonful of cream; mix all together and place in a room where the flies are troublesome, and they will soon disappear.

2. The butchers of Geneva have from time immemorial prevented flies from approaching the meat which they expose for sale by the use of laurel oil. This oil, the smell of which, although a little strong, is not very offensive, drives away flies, and they will not come near walls which have been rubbed with it.

3. Flies are kept out of stables (a place they propagate in in great numbers) by using sawdust, which is saturated with carbolic acid, diluted—one part of acid to a hundred parts of water. The sawdust, scattered about the stables, keeps all flies away. A similar application of the acid ought to keep flies away from kitchens.

CORRELL'S WHEAT (1908).

In the April number of the *Journal* appeared an exhaustive illustrated article on Wheat Selection by Mr. E. A. Mann, Agricultural Chemist, in which he gave a description of several wheats evolved by Mr. J. Correll, of Arthur River. Among the number was one named by Mr. Correll, "Le Huguenot," a full-bodied, beardless variety. Samples of these wheats were included in the Western Australian section at the Franco-British Exhibition. Attention was called by the South Australian Court at the Exhibition to the similarity of the "Huguenot" to a specimen of a wheat called "Beardless Medeah," shown in the latter State's Court. Ears of the last-named wheat were received from London by the Department and submitted to Mr. Mann, and he expressed the opinion that the two wheats were alike.

Referring the matter to Mr. Correll, that gentleman wrote to say "Beardless Medeah" is a name given to "Le Huguenot" which had been grown in South Australia from stock supplied by himself. He says that all the "Huguenot" wheat now in South Australia originated from two pounds of seed he sent to Mr. E. Correll nearly four years ago, and five bags sent three years ago. Seed of this and other Correll wheats has also been sent at various times to other States, and has been distributed to farmers in the Southern districts in this State from whom in the majority of cases favourable reports have been received, showing prolificness and bunt resisting qualities.

Mr. Correll thinks the facts prove his claim to be the originator of the "Le Huguenot" wheat, and that "Beardless Medeah" has been wrongly bestowed on it. Experiments have been carried out by himself and his brother on their farm in South Australia, and the "Medeah" crosses cultivated, some of which are beardless and semi-solid in the straw, while others are quite solid. "Le Huguenot" is a great improvement on these, due entirely to Mr. J. Correll's efforts.

SUB-IRRIGATION ON THE GOLDFIELDS.

Mr. G. Chitty Baker, who recently visited the Eastern Goldfields, has forwarded the following report to the Under Secretary on the subject of sub-irrigation in that district:—

Re-Sub-Irrigation.—I beg to report, for the information of the Kalgoorlie Municipal Council and other interested bodies, that the following manner of watering grass plots has been found to give the best results:—

The ordinary 2in. agricultural drain pipes should be laid at a depth of from 6in. to 9in. from the surface, resting them on a layer of sand about an inch thick; strips of thin card, or two or three thicknesses of newspaper, about 2in. wide and 4in. long, should be laid on the top of the joints and bent round the sides, to prevent the top soil getting into the pipes and silting them up.

The water should be applied in as great a volume as possible, so that it will spread with more rapidity than if applied gently, when it would have a tendency to sink. The main feature is to first saturate the soil to a depth of, say, 9in., and then supply sufficient water to keep it always moist.

If the water is applied gently, or the ground not thoroughly saturated, there will always be the unsightly lines of rank growth immediately over the lines of pipe.

If, on the other hand, too much water is applied, then a quantity of it will run to waste. A good plan to find out the exact quantity of water required to saturate the soil to a depth of 9in. is as follows:—

Take a box or tin, one foot square and nine inches deep, well perforated at the bottom. Over the perforations lay a piece of hessian or similar material. Fill this box with soil from the plot intended to water; thoroughly dry the soil in an oven or on a sheet of tin in the sun. (Do not burn it or the humus will be destroyed, and the moisture-retaining properties greatly reduced). After being thoroughly dried, fill the box and strike off level; weigh carefully, after which thoroughly soak. Then drain for at least 12 hours in a cool shady place; weigh again, and the difference in weight will be the quantity of water required for each square foot of surface, every 10lbs. representing one gallon of water to be applied. By this means a saving of from 70 per cent. to 80 per cent. of water can be made, with better results.

Attention is required for a time to see that the ground does not become dry, as the nature of the sub-soil will affect the retention of the moisture; always remembering that a soil well impregnated with humus will retain nearly double its own weight of moisture, as against 10 per cent. to 20 per cent. in weight of those soils not containing humus.

EXPORTING FRUIT TO LONDON.

Now that the possibilities of profitably placing Western Australian fruit on the London market have been definitely demonstrated, it should be clearly recognised by our local exporters that essential conditions must be observed to win the best success and gain top prices. The fruit must not only be carefully selected and carefully packed, but also presented to the eyes of buyers in the most attractive form. The British consumer is fastidious in these respects. For instance, fruits for the London market are now placed in suitable cases, wrapped separately with tissue paper bearing some particular design, brand, or name of the grower. Apple wrappers of this description can be obtained in Perth, on order, in quantities to meet the requirements of individual exporters, and at prices which range between £3 and £4 10s. for 10,000, and £11 and £16 for 50,000. The attention of fruit-growers and intending exporters is drawn to these facts, the Department being desirous to see the export trade develop on correct lines, and most likely to prove remunerative to the growers.

FRUIT EXPORT TO CEYLON.

An experimental shipment of cherries was forwarded by the R.M.S. "*Himalaya*" in December, consigned to Mr. F. Crosbie-Roles, editor of the *Times of Ceylon*. In its issue of December 24, the following reference to the fruit appeared in that journal:—

"Yesterday we received by the mail steamer a consignment of excellent cherries sent by Dr. Hackett, the well-known proprietor of the *West Australian*, as a sample of the fruit of the State of Australia which is nearest to us, and as a test of the conditions of shipment. The cherries were sent in 10 wooden cases, each containing two compartments holding distinct varieties, a pound each. There were three varieties—the St. Margaret, Bigaroon, Napoleon, and Florence. The first-named were in a riper stage than the two others, being sweet and of delicious flavour, while they did not seem to have suffered any more than the less ripe cherries during the voyage. The St. Margaret and the Bigaroon Napoleon seemed to be excellent fruit in every respect. We promptly distributed the cases among the managing directors of the principal hotels and others, also sending one to His Excellency the Governor, and we hope soon to get their opinion of Western Australian cherries. These were grown on Dr. Hackett's estate, Cherrydale, Donnybrook. There can be little doubt that with proper arrangements for bringing them in good condition there would be a good market for this kind of fruit in Ceylon. They would always lend much-needed variety to the not too extensive range of tropical fruits available in this island, even in the most plentiful seasons. The cherries had travelled excellently, were handsome in appearance, and delicious to taste. In size they compare very favourably with the average English cherry."

THE COTTON INDUSTRY.

A VALUABLE BY-PRODUCT.

(*Irish Farming World*).

The object of a recent experiment in Kent was to see whether cotton seed oil could be used as a cream substitute, *i.e.*, the oil to be fed with separated milk. It has been conclusively shown that cod liver oil forms a very economical substitute for cream when fed with separated milk, but cod liver oil possesses a disagreeable odour which is objectionable where the preparation of the calves' food takes place adjacent to, or actually inside the farmer's kitchen, as well as being liable to adulteration with cheaper and unsatisfactory

fish oils. Cotton seed oil is free from all strong odour and is also cheaper, the price being 2s. 5d. per gallon, against 4s. 6d. to 5s. for cod liver oil.

There were six calves eight weeks old which had been receiving new milk only, divided into two lots of three each. The experiment lasted five and a half weeks; at the beginning of the period, Lot 1 received 8 quarts of milk per head daily for the first week increased to nine quarts during the second week, and then gradually decreased by substituting linseed cake gruel, until the fourth week, when the new milk which had been reduced to four quarts daily remained at that quantity until the end of the experiment.

Lot 2 received half separated milk and half new milk for the first week—viz., four quarts of each daily; during the second week no new milk was fed, its place being taken by nine quarts separated milk daily, which was increased to ten quarts during the third week and remained at that quantity for the remainder of the period. The cotton seed oil was added to the separated milk and thoroughly stirred in. The quantities fed per calf per day were at first one-and-a-half, then two, and finally three table spoonfuls; the oil being increased along with the separated milk.

Each calf of both lots received a weighed quantity of hay daily, which averaged about 1 and a third lbs., and in addition finely ground linseed cake fed in the dry condition, starting with 4oz. per head daily for the first week and then 6oz. daily for the remaining four and a half weeks.

The liquid food was fed to all the calves at a temperature varying from 90 degrees to 95 degrees F.

Value of the Foods Given.

New milk is reckoned to be worth 7d. per gallon on the farm.

Separated milk is valued at 1d. per gallon.

Linseed cake at £8 10s. per ton, ground.

For purposes of comparison only those foods which differed for the two lots are valued in the table below, the cost of the other foods being the same for the two lots.

Comparative cost of the two rations:—

Lot 1.—Total quantity of food given during the 5½ weeks—

	£	s.	d.
56 gals. new milk per calf at 7d.	4	18	0
18½ lbs. linseed cake per calf as gruel at £8 10s. per ton	0	4	2
Cost for 3 calves	£5	2	2
Cost per calf	1	14	1

Lot 2.—Total quantity of food given during the 5½ weeks—

4½ gals. new milk per calf at 7d.	0	7	10½
84¾ gals. separated milk per calf at 1d.	1	1	2½
1¼ qts. cotton seed oil per calf at 2s. 5d. per gal ...	0	2	0½
Cost for 3 calves	1	11	1¾
Cost per calf	£0	10	4½

This shows that the cost of the trial foods of Lot 1 was more than three times greater than that of Lot 2.

The calves of Lot 2 appeared to thrive well, and the cotton seed oil did not in any case produce either scouring or the opposite effect.

Live Weights.

The average live weights at the beginning and during the experiment were as follows:—

Lot 1.—New milk and linseed cake gruel. Average per head: At starting April 4th, 146; April 18th, 168; May 12th, 199. Increase for whole period, 53; increase per head per week, 9.6lbs.

Lot 2.—Separated milk and cotton seed oil: Averages per head: At starting, April 4th, 167; April 18th, 191; May 12th, 219. Increase for whole period, 52; increase per head per week, 9.5lbs.

The results show that the live weight increase per head per week was approximately the same in the case of the two lots, viz., 9.6 and 9.5lbs., respectively. It is only fair to state, however, that two of the calves in Lot 1 (new milk and linseed cake gruel) could not be induced to eat their full daily allowance of dry cake, otherwise the live weight gains in Lot 1 would probably have been slightly better than was actually obtained in the experiment, still such increased gain would have been obtained at a considerably greater cost as the table containing the cost of food shows.

Such good results with cotton seed oil have been obtained in this preliminary experiment that it would appear this oil may form a useful cream substitute, though it is possible that it may not be suitable for young calves at that age (viz., two to four weeks old), at which a cream substitute should, from the point of economy, begin to form a part of the ration.

PRACTICAL PIG-KEEPING.

BREEDING.

(R. D. GARRATT.)

No one should go in for breeding pigs unless he has ample room and convenience for that purpose, and is also in a position to give full and regular attention, either personally or otherwise. Anyone can keep a pig, or a few pigs, and feed them in a place roughly but comfortably made for that purpose. There must be not only sufficient room in a sty to keep a sow and pigs, but there must be outdoor accommodation in the shape of an orchard or meadow. It is as necessary for the young growing pig and the sow that they should have a run and plenty of exercise as it is that they should have housing and food.

It is as natural now for young growing pigs to get out to dig and root and eat some earthy matter as it was when pigs were in a wild state. If the young sucking pig cannot be let out and have its run, care must be taken that it has plenty of green food, cinders and earth, and whatever it will get at if let out; and even then the exercise will be missed, for it is next to impossible to bring up a growing healthy lot of pigs shut up in a cramped place. I do not say that they are not bred successfully in good roomy places, but many ills are caused by this way of breeding them. They will often go

humpbacked, get crampy, scour, and do badly, all of which might in a great measure be avoided by plenty of outdoor exercise. No breeder, then, is in a good position for breeding unless he has an orchard or a run out of the styre somewhere.

Pig-breeders may be divided into two classes—the farmer, who may keep from three or four sows up to twenty or more, and the tradesman or labourer, who keeps one, two, or more. In the case of the farmer, he usually has his range of styes or pig-yard, and the attention and care are left to the stockman, assisted by the owner. In the latter case there is a regular routine as regards feeding, mode of pigging the sows, and general treatment.

The labourer as pig-keeper, if thrifty and industrious, may make one pig, or two or three, pay him as well as any class. He could get one in and try, and if he is going to make it profitable, he must see to it well and not neglect it, and he must have every convenience and room. Sanitary laws are now very strict, the styre must be a certain distance away from any dwelling, so as not to prove a nuisance. All the work of building the styre and making the yard he can do himself at very little cost.

ANIMAL TUBERCULOSIS.

(San Francisco Chronicle.)

Dr. A. D. Melvin, Chief of the Bureau of Animal Industry of the United States Department of Agriculture, in an address before the International Congress on Tuberculosis at Washington (Tuesday morning, September 29th), pointed out the heavy economic loss sustained by the live stock industry because of tuberculosis and discussed measures for the control and eradication of this disease.

Dr. Melvin said, in part :

“While the saving of human life affords the highest motive for combating tuberculosis, the prevention of financial loss is alone a sufficient reason for undertaking the eradication of the disease from farm animals.

“Statistics of the United States Federal meat inspection for the fiscal year ending June, 30, 1908, covering 53,973,337 animals, or more than one-half of those slaughtered for food in the country, show the following percentages of tuberculosis :—Adult cattle, 0.961 ; calves, 0.026 ; hogs, 2.049 ; sheep and goats, 0. The proportion of tuberculosis is probably higher in animals slaughtered without inspection.

“Reports of tuberculin tests made in the fifteen years from 1893 to 1908 by Federal, State, and other officers with tuberculin prepared by the Bureau of Animal Industry have been carefully analysed and tabulated. Out of 400,000 cattle tested (most dairy cattle) there were 37,000 reactions, or 9.25 per cent.

“From these two classes of statistics it is concluded that on an average about 10 per cent. of the milch cows, 1 per cent. of other cattle, and 2 per

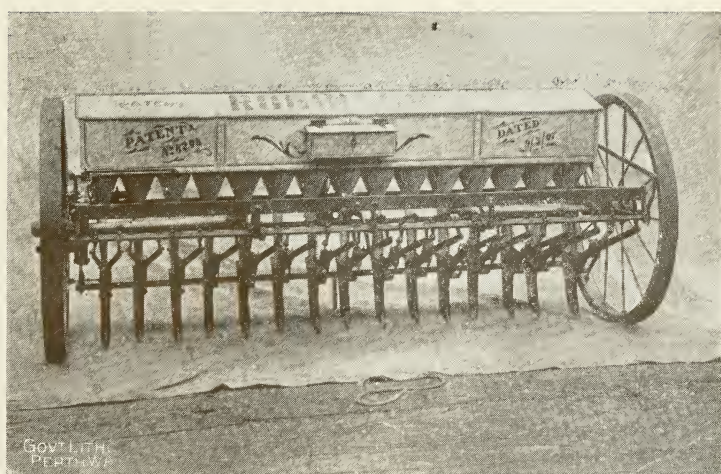
cent. of the hogs in the United States are affected with tuberculosis, the average percentage for all the cattle being estimated at 3.5.

"The accuracy of the tuberculin test has been confirmed in a remarkable way by post mortem examinations. Out of 23,869 reacting cattle slaughtered, lesions of tuberculosis were found in 23,585, a percentage of 98.81. Properly prepared tuberculin applied by a competent person is therefore shown to be a wonderfully reliable agent for diagnosing tuberculosis. In cases where the test appears to give satisfactory results this is usually due to the use of a poor quality of tuberculin or to ignorance or carelessness in applying it.

"The economic loss on account of tuberculosis in food producing animals is heavy. The loss on animals in which tuberculosis is found in the Federal meat inspection is estimated at 2,382,433 dollars annually, and if the same conditions were applied to animals slaughtered without Federal inspection the annual loss on all animals slaughtered for food in the United States would be increased to 4,102,433 dollars. The stock of animals on hand is also depreciated in value, because of tuberculosis. Assuming that living tuberculosis milch cows are annually depreciated to the extent of one-tenth of what the loss would be if they were slaughtered, other cattle one-third, and hogs one-half, the total annual depreciation amounts to 8,046,219 dollars. The annual loss from decrease in milk production is estimated at 1,150,000 dollars, and there also is some loss from impairment of breeding qualities, etc. Taking all these items into account, the aggregate annual loss because of tuberculosis among farm animals in the United States is estimated at not less than 14,000,000 dollars.

"Such heavy financial losses make the eradication of tuberculosis from farm animals very desirable purely as an economic matter. As the disease is found principally among cattle and hogs, and as most of the infection in hogs is derived from cattle, the main effort should be directed against the disease in cattle. Among the measures proposed are the following: Live stock owners should be educated by means of official publications, the agricultural and general press, lectures at farmers' institutes, etc. Public authorities should make a systematic effort to determine to what extent and in what localities the disease exists, and should apply the tuberculin test systematically to the cattle in sections where this seems desirable. Reacting animals should be slaughtered under competent veterinary inspection, so that the loss may be minimised by passing carcasses for food where the infection is so slight that this can safely be done; dangerous carcasses, of course, to be condemned. In the case of valuable breeding animals where slaughter would involve great sacrifice, the Bang system of segregation may be used. A system of tagging all cows sent to market is advocated, so that when animals are found tuberculous in the meat inspection they may be traced back to the place of origin, centres of infection located, and steps taken for eradication. The Bureau of Animal Industry is already co-operating with the authorities of some States in reporting and tracing the origin of tuberculous animals. Each State should require that all cattle brought in for breeding or dairy purposes shall have passed the tuberculin test.

"As the eradication of tuberculosis is largely a public health measure, it is only reasonable that the persons whose cattle are slaughtered should be paid indemnity, at least in part. This is not only just but is absolutely essential if the co-operation of cattle owners is to be secured. Several States already have provisions of this character.



New Cogless Drill—Front View.

"The benefits to follow from the eradication of tuberculosis from farm animals are so great and so obvious that the necessary expenditures, even though they must be heavy, may be regarded as a highly profitable investment."

NEW COGLESS DRILL.

AN AUSTRALIAN INVENTION.

We give an illustration of Messrs. T. Robinson & Co.'s New Cogless Drill which the agents, Messrs. Gardner Bros., have just landed from Victoria. This drill is one of the first models made. Its principal features are its wonderful simplicity; it does away entirely with the cog gear so troublesome in all makes at present on the market, and always the weak point of all drills, very subject to breakage, besides considerable cost for repairs.

A feature of the New Cogless Drill is that the fertiliser and grain feed is driven off the main wheel by an eccentric motion by two cams, giving a shaker motion to the rods, which are connected with the star feeds on both the grain and fertiliser boxes. The star feeds instead of revolving have a backward and forward motion. This motion has been proved by extensive field trials in Victoria to be equal to the ordinary force feed of the old style of drills, besides doing away almost entirely with breakages and repairs. There is also an improved agitator in the fertiliser-box driven by a similar motion from the off wheel, which keeps the manure always loose and running freely. Only one lever throws the drill in and out of motion, whereas in the old style there are usually two. There is also a new and improved ratchet-indicator for measuring the acreage sown, which is absolutely accurate. The quantity of manure and grain sown may be very quickly regulated by lifting the rods into different holes in the adjusting bracket of driver and shaker motion.

The New Cogless Drill should be easy to repair by any intelligent farm labourer, being extremely simple in its action it is not liable to breakage as other drills are. The workmanship of the machine is of the highest order of mechanical construction.

We understand that field trials are to be given in various centres to demonstrate its practical working in the field. Although this model drill has been in the State only a few weeks, and no field trials have yet been given, practical farmers who have seen it are so impressed with its novel features that they have placed a number of orders for the coming seeding. Heretofore most of the drills used in Australasia which enjoy a reputation for efficiency have been imported from the United States; we are, therefore, glad to see that a drill of the highest type, and superior to anything yet placed on the market, has been made in Australia and is a purely Australian invention.

WILL A CHANGE OF SEED PAY?

By A. L. BAKER.

This is a question that often arises in the minds of farmers when considering what varieties of seed wheat, oats, or other grain shall be sown for the coming season.

Farmers should make the selection of their seed an important point, as under exactly similar circumstances one variety will almost double the returns of another. To state definitely which are the most profitable varieties of wheat, barley, or oats, would be an impossibility, as different varieties thrive under different conditions. In selecting seed try to get that which suits your conditions as near as possible. To a great extent this is found out by experience, but there are rules to go by in a great measure. For instance, an early and quickly maturing wheat is necessary for a dry district where the season terminates quickly, and as one approaches the wetter and later climates, the later wheats, as a rule, give better results. Where a farmer is growing for grain, a variety that is known to head well should be sown; but if for hay, a variety that gives a bulk of good quality straw would be better. A farmer that has to rely on the stripper as a means of harvesting should select a good standing wheat, not too hard to thresh, whilst on the other hand these points are of little importance where the binder and thresher are used, and a wheat that shells easily is rather a disadvantage.

Few farmers, however, fully realise the importance of the question and the extent that new and improved varieties of seed will increase the yield of their crops. It is probably sometimes not so much a want of knowledge of these facts as the question of economy that influences farmers. It goes against their grain to sell their wheat at, say, 3s. 3d. to 3s. 6d. per bushel and buy seed at from 4s. 6d. to 6s. per bushel.

The whole question is, however, an economical one, and if it did not pay the practice would not be so general as it is in the Eastern States and in other parts of the world.

The cost of 5 to 10 bags of some new or improved variety of seed wheat is not very great when considered from the standpoint that it only represents the difference between the market price of the old and the new variety of wheat, which amount approximately from 1s. to 2s. per bushel; as, if improved seed is purchased the old may be sold. The fact should also be taken into consideration that the improved seed can be produced cheaply for the succeeding crop.

The introduction of new and improved varieties of wheats and other grains has doubled the wheat in some cases, while in others the increase has only amounted to one or two bushels. Even where the yield has been increased by only one bushel per acre the extra cost of the seed is justified, as it rarely happens that the increase in the cost of the seed amounts to the value of the increase of the crop. If, however, the increase in the yield was more than one bushel per acre and an advanced price could be obtained for the crop for seed purposes the profit would be considerable.



New Cogless Drill—Side View.

The wheat yield may be increased by better methods of cultivation, fertilising, and planting improved varieties of seed; and when we remember that the future prosperity of the State is so closely associated with the development of the farming industry, and particularly the production of wheat, it is difficult to understand the apathy of the average farmer in this direction; and especially in the matter of seed improvement.

It is generally recognised by stock-breeders that the introduction of fresh strains is necessary to maintain a high standard of profitable stock, and it should be equally important that wheat-growers should do so. It is a fact that grain grown year after year in the same ground and in the same locality tends to degenerate both in yield and quality. Old varieties degenerate principally because in every-day practice the necessity of selection of the best grain for seed is either overlooked or ignored. It is one of the fundamental laws of Nature that "like begets like." The seed wheat is often taken from the bulk yield indiscriminately, and often poor, pinched grain is planted. It is unreasonable to expect that this will yield as heavy a crop as where selected seed has been planted.

It is a question whether the beneficial results usually obtained from the introduction of fresh seed are due to the influence of the change of locality or to the better methods of selection necessary to produce new varieties. It has been noticed that seed taken indiscriminately from any wheat that happens to be grown on the farm always produces a crop which in time shows degeneration, and the quality and yield show a falling-off. This probably accounts for the disappearance of varieties at one time enjoying the greatest popularity and their replacement by others.

New varieties, given that they are adapted to local conditions, are apt to give better results than those in common use, as they are the result of careful selection from the best portions of succeeding crops for years before they are placed on the market. The wheat grower, unless he possesses the knowledge, time, and patience necessary to improve his seed by systematic selection and breeding, will have to rely upon others to a certain extent for his seed, unless he is satisfied that a change of seed is not necessary.

Seed wheat properly produced is worth considerably more than "fair average" quality samples, which is what most farmers use for seed. It is impossible that our wheat yield will increase if the seed used is only f.a.q., or that the resulting crop will long continue to be f.a.q. Apart from the selection of varieties of seed wheats a great deal may be done to increase the wheat yield by carefully grading the seed. Many farmers have already recognised the importance of this, and now small graders will be found on many of the up-to-date farms in the State. If the seed wheat is put through a grader it is surprising the amount of cracked and inferior grain, besides the seeds of weeds and other foreign matter, that will be found in an ordinary average sample. While there are some types of graders that only perform the work they are supposed to do in a perfunctory and incomplete manner, there are others that will make a splendid sample.

It should be obvious that a plump and fully matured grain of wheat will produce a better crop when used for seed than seed in which there are a large percentage of immature and cracked grains.

There is also another aspect of the case. If all cracked and inferior wheat and foreign matter is taken out by a grader it will naturally take much

less seed to sow an acre. This fact should also be taken into consideration when buying seed wheat, as a properly graded sample will go much farther, apart from giving much better results. Farmers should exercise an unceasing vigilance and keep troublesome weeds from getting established on the farm. It is hardly realised to what extent the different varieties of weeds which are now becoming common to the State are responsible for a decrease in the wheat yield. While some farmers recognise the economic or feeding value of such weeds as trefoil, cape-weed, etc., there is not the slightest doubt that where these weeds are found growing in a field of wheat it can only be to the detriment of the wheat. The fact that they are found growing luxuriantly in a crop of wheat would show that they are an equally hardy, if not more vigorous, plant and must necessarily rob the wheat plant of a certain amount of light, air, moisture, and the fertilising properties contained in the soil.

While the feeding value of some weeds in the stubble is recognised, they should have no place in a crop, and every plant other than that sown should be regarded as a weed.

Weeds not only decrease the yield when present in a crop but deteriorate the value of hay, sometimes as much as 20s. to 30s. per ton.

Every farmer, however, does not possess a grader nor yet the means to buy one, and in such a case it will pay him to buy his wheat graded. He may have to pay an additional sixpence per bushel for the graded seed, but he has the satisfaction, if he does so, of knowing he will get a better yield, not introduce any weeds, and less seed will be required.

Notwithstanding all this, there seems to be an absence of earnest local effort to improve our wheat yield, and we are content to jog along year after year in the same dull track of routine; and although opportunities of obtaining new and improved varieties of seed wheat are offered many of our farmers have not sufficient enterprise to try them.

As an illustration of the advantages of sowing improved and selected seed wheat over the ordinary sort, the "Federation" wheat—a variety bred by the late Mr. Farrer—has over a great area of the Commonwealth added more than a bushel per acre to the wheat yield.

Mr. Ben. Matthews, of York, sowed last year 100 acres of "Federation" wheat and has just harvested an average of over 30 bushels per acre over the whole area. He also had the distinction of winning the Grand Prix (1st and special prize) at the Franco-British Exhibition with some of this wheat, which he grew the year before.

"Baroota Wonder" wheat, in our own State, has also added considerably to the quantity and the value of the hay crops. "Baroota Wonder" wheaten chaff exported to Sydney and Melbourne during the latter part of last year brought top market price, thereby earning for Western Australia the distinction of producing the best chaff in the Commonwealth.

There are many other varieties of seed wheat and oats introduced into Western Australia during the last couple of years, and the most notable success has been achieved with the following varieties:—Smart's "Early Pioneer," "Comeback," Carmichael's "Eclipse,"; while the West Australian bred varieties, "Alpha" and "Le Huguenot," have given some splendid returns. The "Alpha" was bred by Mr. Berthoud, of the State Farm at Hamel, and has been a conspicuous success. Notwithstanding the season this year it has given highly satisfactory returns and has

been a distinct acquisition to the State. Its fame has evidently travelled, for a shipment of "Alpha" seed wheat is being made to South Australia and Victoria this month. It is a cross between the "Steinwedel" and "King's Jubilee," and combines the good qualities of both without their faults.

Mr. Berthoud is also responsible for another fine wheat, "Crossbred 73"; this is also a cross between "Steinwedel" and "King's Jubilee," but possesses slightly different characteristics, and is considered by some to be rather better than "Alpha."

"Le Huguenot."—This is a new beardless Macaroni or Hay Wheat introduced from South Australia by Mr. Jos. Correll, of Arthur River (W.A.). It is the result of an accidental cross between the "Medeah" wheat, a bearded wheat that had for its home the shores of the Mediterranean, and one of the milling or white sorts. It took over eight years of patient selection before it became a settled type, and at present it closely resembles its parent, the "Medeah," both in straw and in grain, without the beard. It has received some further trials this year in Western Australia, and has proved a remarkably fine wheat for hay purposes, and suitable for dry districts. It has attained a height of over 7 feet under ordinary conditions. The straw is almost solid in every joint, the centre being filled with a pithy development giving it the name of solid straw. It makes a very fine sample of chaff, as the straw does not split in chaffing, and the hay retains a dark-green colour. The grain has a very fine appearance, being large and plump. It is, however, somewhat difficult to strip.

The older varieties which are enjoying the most popularity are "Lott's," "York Champion," "Marshall's No. 3," "Steinwedel," "Purple Straw," "Yandillah King," and "Baroota Wonder." Owing to their superior qualities these varieties still find a good deal of favour among growers. If good graded seed, true to name, can be procured of these varieties the grower would not go far wrong in sowing them.

Among the oats the "Cape" has been about the heaviest yielder this season, and some of the varieties bred and introduced by Garton's, England, show great promise. "Skinless barley" has also jumped into popular favour for early green feed.

It will, therefore, be seen that an interest is being taken in introducing new and improved varieties with a view of increasing our yields; and it is to be hoped the interest will become more general.

It is patent to everyone who knows the best tracts of land in Western Australia eminently suited for the cultivation of wheat that when brought under cultivation, as they are soon destined to be, Western Australia will become one of the largest wheat-producing States in the Commonwealth.

CARE OF COLTS AND HORSES' FEET.

(Farmers' Advocate.)

The principal points to be observed in the care of either colts' or horses' feet are to keep them in as near a natural shape as possible, and in hot, dry weather to provide moisture. The first few months of mosts colts' lives are spent on pasture, and under such circumstances the feet require no attention. There is a constant growth of horn or hoof. The coronary band, which is a highly-sensitive and vascular substance, situated in a groove in the upper border of the hoof, forms the horny wall. This band is constantly depositing hoof substance on the upper margin, which forces downwards the hoof already formed. In order that the hoof may maintain a normal shape and size, the hoof must be worn off or cut, or rasped off the lower border of the sole in proportion to its growth from the top. Of course, during young life, when the foot should increase in size in all directions as the animal grows, the waste is not equal to the repair, but when the foot has reached full growth, the one must equal the other, else the foot will become abnormal. When colts or unshod horses are on grass, the natural wear is sufficient, but as soon as the weather becomes cold and colts are kept in the stable most of the time, the danger commences. The growth of horn continues, but the wear practically ceases, hence the foot becomes deep at the heel and long at the toe. The walls of the heel, after having grown downwards below the frog, have a tendency to bend or curl inwards, the bars not being sufficiently strong to prevent it. There is also a tendency to decay of the frog, especially when the stalls are not regularly cleaned, but the colt allowed to stand upon an accumulation of its own manure, both solid and liquid. This causes the colt to stand in an unnatural position, in many cases standing and walking too much upon its heels. The heels continue to curl inwards, and lessen space in which the bones and the sensitive parts are situated, and even at this age predispose to disease, and in some cases actually cause it by undue pressure. The position of the whole limb is altered; undue tension forced upon the flexor tendons, and upon certain ligaments of the joint, which tend to weaken, and in some cases actually stretch them by continued tension, when the pasterns descend and the fetlock pad almost touches the ground. It is not uncommon to notice a colt practically ruined for life for want of intelligent attention to the feet during its first winter. The careful caretaker will examine his colts' feet regularly, and, with a hoof-hook or other instrument, will clean the sole well out in order to prevent an accumulation of manure or other dirt, and also to enable him to observe any disease of either sole or frog. So soon as he notices the hoof becoming abnormal in shape, he will trim it with a blacksmith's knife and rasp to its proper form. He should be careful to keep the heels well rasped down, and the toe well cut off; also, of course, cutting or rasping the lower border of the wall in proportion. This trimming should be done once monthly during the time the colt is stabled. Just so soon as the colt can be allowed to run the greater part of the time on bare ground, the wear will equal the growth; hence the rasping and cutting will cease, only to

be necessary again the next winter. When the colt has reached that age at which he is required for work, and must wear shoes, the conditions change. If our roads were such that it were not necessary for our horses to wear shoes, there would be much less lameness. The wearing of shoes undoubtedly predisposes to diseases of the feet. At the same time, it is not possible to drive horses on our hard roads during mild weather, or on our slippery roads during the winter, without shoes. Careless or ignorant shoeing particularly predispose to, and in some cases actually cause, disease. Probably one of the greatest mistakes noticed in shoeing is the use of high calkins. This is principally noticed in heavy horses. High calkins serve no good purpose; they do not remain sharp any longer than low ones, neither do they make the horse more sure-footed on slippery roads. They elevate a horse too much, and increase the danger of altering the proper level of the feet, thereby causing undue tension on certain tendons and ligaments, and predisposing to strain. When a horse is to be shod, the foot should be dressed with knife and rasp to as near the normal shape as possible. The shoe should then be made to fit the foot, with as little burning as possible, and, when necessary to add calkins, they should not be made any longer or higher than necessary. When calkins are not necessary, as for a light horse in mild weather, a flat shoe, which will allow the frog of the foot to reach the ground and bear its share of pressure, gives the best results. Fortunately, our country is fairly well supplied with intelligent shoeing smiths, who understand their business, often better than the men who own the horses they shoe. Taking it for granted that the horse is well shod, the question arises, "How should the owner or groom treat him so as to minimise the danger of disease?" During damp weather, probably all that he can do is to clean the foot out well and carefully at least twice daily, to prevent any accumulation of dirt or lodgment of stones or other foreign matter in the sole or frog, and see that the shoes are removed and reset every five or six weeks at most. Now, the shoeing smith must remove with knife and rasp sufficient old horn to equal the new growth, in order to keep the feet the proper size and shape. When the horses are at pasture during the night, a sufficient amount of moisture will be gathered from dew and rain to keep the feet in good condition, but during a long-continued spell of hot, dry weather, horses that are kept in the stable must have an artificial supply of moisture to the feet, else they will become dry, brittle, and hot, have a tendency to contract, and predispose to disease. Many kinds of hoof ointments and dressings are manufactured for this purpose, but it is doubtful whether any of them do much good, and many of them may be actually harmful. These dressings improve the appearance of the feet by removing the dry appearance, and, when not too plentifully applied, are not likely to be harmful. The feet require moisture, and there is no question about the fact that this can best be supplied by applying water. This can be done by poulticing, standing the horse in a tub of water for an hour or two daily, applying soaking pads, or stuffing the feet with wet clay, linseed meal, etc. Probably the easiest and most satisfactory way is soaking pads, made of thick felt, which are soaked in water, and then buckled around the coronet, and allowed to cover the whole exposed surface of the wall. In addition to this, it is well to pack the sole with wet clay or other substance that will retain the moisture. As a means of lessening concussion on hard roads, which is the principal exciting cause of foot lameness, the wearing of rubber pads answers well, but these should not be worn constantly,

as they, to a large extent, prevent the admission of air to the soles, and tend to cause a disintegration of frog and sole.

To sum up in a few words, we may say: Keep the feet level, and in as natural a shape as possible; shoe so as to give even pressure on the whole wall and the junction of the wall and sole, and, if possible, the frog; keep sole and frog free from foreign matters; supply moisture, and have the shoes removed at least once every five or six weeks.

APPLICATION OF REFRIGERATION TO THE MEAT INDUSTRY.

The third of the interesting series of lectures which are being delivered at the College of Agriculture, Edinburgh, by Professor Loudon N. Douglas, was given on November 30th, and was on the subject of Refrigeration as applied to the Meat Industry. It was listened to by a large and distinguished audience. The lecture was illustrated throughout by many lantern slides, diagrams, laboratory experiments and exhibits of various kinds, all of which contributed to a thorough understanding of the subject.

The lecturer stated that the early history of refrigeration was somewhat obscure, and he proceeded to give examples of the first application of cold in its primitive form. Records of the cooling business, however, did not begin until the nineteenth century, and even then it was not till about 1850 that we might say that proper records became available. About that time the natural ice business had grown to great dimensions and it would appear as if natural ice had become the principal source of cooling effects in all countries. In 1834 an English patent on the subject of the utilisation of compressed gas as a refrigerating agent was taken out by Joseph Perkins. In France, also, in the fifties, Carre had worked at refrigeration: first with ether, and then with ammonia. From 1860 to 1870 was a busy time in the developing of refrigerating machinery, and it then became apparent that the natural ice business would soon become a thing of the past. In 1879 Bell & Coleman installed refrigerating machinery on board the "Strathleven" and brought the first cargo of frozen meat to London, and since then the fleet of steamers which was engaged in this business had become an enormous one.

The lecturer proceeded to give an interesting description of the theory of refrigeration and explained his meaning by demonstrating the various refrigerating effects produced from freezing mixtures, and afterwards traced the business throughout its various stages to the highly complex, duplex refrigerating machinery. On the subject of insulation, a very great deal could be said, and the various specimens which were exhibited showed the great diversity which exists in insulating material. Their relative values,

however, could be clearly stated in a concise manner and their uses reduced to an absolute rule.

The method of application to the meat industry of cooling effects had three principal aspects :—

- (a.) Fresh meat storage in abattoirs or in shops.
- (b.) Pig-chilling and bacon-curing.
- (c.) The import of frozen meat.

It was possible to give many illustrations of all those various aspects, and many interesting pictures, showing the gradual application of the refrigerating machinery to the small shop and to the large emporium, and then to the abattoir and the factory, were exhibited, and the distinctions that exist between the various applications were carefully pointed out. By means of a very complete model, the lecturer was able to show the construction of an ideal cooler, by which it became possible to circulate the air of a room or any number of rooms, and he proceeded to say that in connection with fresh meat, the circulation of the air was indispensable, as it was also for chilling purposes, but that where meat was required to be frozen, there did not exist the same necessity for air-circulation ; but a better method was, first of all, to chill the meat by circulation and to subsequently reduce its temperature further, by means of still air, until it reached any degree above zero that might be considered necessary.

In conclusion, it was pointed out that in the storing of meat as in the cooking of meat, muscular tissues must be regarded as an extremely bad conductor of heat, and as a consequence, can only be chilled or frozen slowly. Conversely, it can only be thawed out slowly. The reason why frozen meat decomposes so much on the surface is because of the rapid thawing out of the tissues there, and while the centre of a piece of frozen meat may be perfectly hard and sound, decomposition may have set in on the outside surfaces which have been exposed to a high temperature. In cooking, the non-conductivity of meat is illustrated by that fact that it takes a long time before the heat of cooking or roasting reaches the internal parts of the muscular tissue ; bones, however, were good conductors and thus they acted in an entirely opposite way to muscle ; and this explained why, in cooking, it was found that the meat close to the bones might be perfectly cooked and at the same time the internal part of the muscles might be in an uncooked state.

It is interesting to learn that, owing to the fact that this course of lectures, which is the first of its kind, has become so popular, there is a likelihood of their scope being extended next year, as to make them form part of an organised course of study which will entitle students, who may follow it up, to a diploma in the meat industry. Should such a course be instituted, it will go a long way to putting the industry upon a higher basis than it enjoys at the present time, and by this means opportunities will be offered to young men who wish to follow the meat industry as their business in life, of acquiring technical knowledge which will be of service to them every day.

TUBERCULOSIS PROBLEM.

CONTROL OF DAIRY HERDS.

Following on the representations made by dairymen in the metropolitan district of Perth and resolutions passed at the Annual Conference of Producers which was held in August last, the Government decided to place dairy cattle in the State under the direct supervision of the Stock Department. This important step, which came into operation on the 1st January, has been taken with the view to effecting greater improvement and purity in the milk supply. In this connection the Minister for Agriculture made the following recommendations to the Colonial Secretary:—

“That all milk from dairies where the cows are periodically tested and can be certified as free from disease, will be designated as ‘certified’ milk.

“Milk from all herds apparently in good health, while not up to the higher standard, to be pasteurised and to be designated ‘guaranteed’ milk. In the opinion of the President of the Central Board of Health ‘guaranteed’ milk is safer than even that of cows certified as clean, by reason of the fluid being absolutely free of disease.”

In order to pasteurise, accordingly, it would be necessary to erect a plant, which, together with buildings is estimated to cost, approximately, £2,500, on some site convenient to the Central Railway Station.

That it should be impressed upon the health authorities that all milk should be compelled to go through the pasteuriser, when derived from dairy herds which had not been certified as being absolutely “clean.”

In his minute to the Chief Inspector of Stock, upon his taking charge of the dairy herds, the Minister particularly impressed upon him the necessity of paying special attention to the cleansing of all buildings in which infected animals had been housed. This, he considered, would prove a very essential factor in successfully combating disease. He urged the grave necessity of fighting this dread scourge (tuberculosis) determinedly, systematically, and in such manner as will conduce to an absolutely pure milk supply for the city of Perth and for the State generally.

The functions of the Stock Department are to observe a rigid inspection of animals from which the milk supply is drawn, and of the environment of those animals. With the Central Board of Health entirely rests the question of purity of food supplied to the public, and the Minister hopes they will adopt the suggestion of public pasteurisation.

The Chief Inspector of Stock, Mr. R. E. Weir, will forthwith make a searching inspection of all herds from which the milk supply of the metropolitan and other centres of the State is drawn. Experts possessed of a thorough knowledge of testing cattle, not only for tuberculosis but for all other diseases affecting dairy herds, will be engaged and the work be carried out systematically and thoroughly in every centre. The elimination of all animals which are likely to yield infected milk will be rigidly proceeded with, and the tuberculin test applied at regular intervals to ascertain the presence or otherwise of tuberculosis. Animals that react will also be gradually eliminated.

POISONING GRASSHOPPERS.

The following is an account of an experiment recently made in the Transvaal to destroy grasshoppers with poison:—

The swarm destroyed was a very large one, covering an area 500yds. long and 200yds. wide. They were in the hopping stage, and travelled closely packed together. They had already consumed every green thing on the adjoining farm. A single pound of arsenate of soda sufficed to destroy the whole swarm. The poison was mixed with 4lbs. of brown sugar, and dissolved with hot water in a boiler. Then cold water was added until a quantity of 12 gallons was made up. Six ordinary bundles (about 36lbs.) of green barley were soaked in it for about fifteen or twenty minutes. The barley was not entirely immersed, but each bundle was loosened so that each stalk could fully absorb some of the liquid, of which about one-third was absorbed by the barley.

By waving flags the swarm was brought to a standstill close to the boundary of the farm. Then the barley was thinly scattered both in front of and among the grasshoppers, in the following manner:—Single stalks were scattered in thin rows over the swarm, each stalk in a row at a distance of about 4ft. from the other, and each row of stalks 10yds. from the next row. In front the stalks were laid thicker. In this manner the barley was distributed over the major portion of the swarm. The rear of the swarm was not interfered with, as there was not sufficient barley. This was, however, of no consequence, as later on the grasshoppers closed up towards the front, and so were enabled to reach the poisoned bait.

As soon as the poison had spread amongst the swarm they came to a sudden halt. There was no need for further flag waving, as the grasshoppers no longer showed any desire to spread over the field. The creatures attacked the barley with avidity. Every stalk was covered with hundreds of grasshoppers, which were all poisoned. Before sunset numbers of the insects appeared sick, but so far none had died.

About 8 gallons of the poisoned fluid were left over. This was used in the following manner:—In the evening a number of grasshoppers, where they were the thickest, were killed by blows from bushes. The bushes were steeped in the poison, and thus the hoppers were plentifully sprinkled with it. On the same evening the remains of the poisoned barley were carefully collected and burnt.

Next morning about one-third of the hoppers were dead, and the survivors were busily devouring them. No more poison was needed. Thenceforward the destruction proceeded automatically. In four days the whole swarm was annihilated. It is remarkable that birds which for two days had fed on the dead hoppers did not seem any the worse for it. The work was very easy, two white men and two natives having been employed only two hours over the business. From the moment the poison was strewed over the swarm they made no attempt during the four days to move on.

THE PATENT AUTOMATIC WATER FINDER.

This is a simple apparatus by which any unskilled person may readily ascertain whether a subterranean spring of pure water exists under a spot where boring operations are desired.

The instrument indicates the presence of subterranean flowing springs at depths up to 1,000 feet.

The principle on which the instrument works is the measuring of the strength of the electrical currents which are constantly flowing between earth and atmosphere, and which are always strongest in the vicinity of subterranean water courses, the flowing waters of which are charged with electricity to a certain degree. Should a subterranean spring be present under where the instrument has been fixed, the needle commences to move; note being carefully taken of the number of degrees on the scale, and the position of the instrument changed from time to time, the spot where the greatest movement of the needle has been obtained is that where the well boring should be made.

If the needle remains stationary, it may be taken for granted that a subterranean spring does not exist under the spot where the instrument is fixed.

The instrument will appeal to those who are interested in "Water Finding," and who can appreciate the importance of having the knowledge before commencing costly boring operations, whether a good spring of water will be found or not within reasonable limits.

Well boring engineers know how often they have bored upwards of 1,000 feet without finding water. The hundreds of pounds spent on any one of these fruitless borings would have been saved by consulting the Patent Automatic Water Finder for five minutes.

Observations should always be taken between 8 and 12 in the morning and 2 and 5 in the afternoon, these being the hours of the greatest activity of the vertical air currents. A fine, calm, clear day should be selected, as the instrument does not work so well when earth and atmosphere are saturated with moisture. The instrument does not work under trees or in the immediate vicinity of iron structures.

The instrument indicates watercourses flowing underground in a natural state, and not water pipes or sources that have sprung up to day-light.

The instrument has been thoroughly investigated by leading scientists and engineers, who have given their professional opinions and vouch for the successful application of the invention.

Numerous experiments have recently been made over metalliferous soils with very satisfactory results, the movement of the needle having a distinct peculiarity according to the ground over which it is working. The value of the instrument is thus considerably enhanced.

The instruments are made in two sizes, the £100 one for locating subterranean springs at depths up to 1,000 feet, and the £50 one at depths up to 500 feet. These prices include packing and delivery f.o.b. steamer, London or Liverpool.



Patent Automatic Water Finder.

Directions for taking an Observation.

1.—Fix the tripod stand firmly on the ground, with the white line, in the centre of the little table, pointing to the Magnetic North, as indicated by the compass sent with each outfit.

2.—Place the instrument on the stand. Place the Magnetic Needle on its pivot. Close the case so that no wind can affect the movement of the needle. After the needle has come to rest observe it closely through one of the windows in the case. If subterranean flowing water is present below the instrument, the needle will commence to move, the strength of its swing depending upon the volume of flowing water below.

Demonstrations of the working of the instrument are given by appointment in the Liverpool district. Purchasers or their agents are invited to witness the final tests of instruments before despatch.

Extract from the "Liverpool Courier."

"The Automatic Water Finder is an invention of the utmost importance and Messrs. W. Mansfield & Co. have already received numerous enquiries for the same from all parts of the world. Experiments are now taking place with a view to using the instrument to locate oil wells as well as water springs, which, if successful, will make the instrument additionally valuable. Last week-end numerous experiments were made in the Wirral Peninsula with surprising results. In addition to finding water for domestic purposes, irrigation, etc., such an instrument is invaluable to architects, showing as it does the existence or not of water on the site of proposed new buildings. It is a well-known fact that buildings most likely to be struck by lightning are those under which a powerful spring is flowing."

A MEDICINAL PLANT.

(*Bacckea camphorosmae*.)

A sample of a brush plant found at Collie was left at the laboratory last month by Mr. J. Pulbrook, which was placed with Dr. Morrison, the Department's botanist, for identification. Mr. Pulbrook states that the plant yields a sweet, aromatic infusion of beneficial medicinal qualities.

Dr. Morrison's report is to the following effect:—

"Although the sample has no flowers, it may safely enough be identified by the foliage as *Bacckea camphorosmae*, one of the natural order Myrtaceae. Its use as a medicine or beverage has been copied from the aborigines, who make an infusion of it, and the properties it has been found to possess are doubtless due chiefly or entirely to the essential oil contained in the leaves. All the plants of the family Myrtaceae yield an oil of this sort, and the selection of this *Bacckea* for making an infusion of seems to indicate the presence of a kind of oil peculiar to this plant, and therefore of special interest from the chemist's point of view."

THE SUNFLOWER : ITS ECONOMIC VALUE.

The common sunflower (*Helianthus annuus*) is a plant of considerable economic importance and is largely cultivated in Europe, Asia, and America for its seeds. According to the Agricultural Ledger, 107, No. 1, an area of 216,000 acres is devoted to sunflower culture in Europe alone, the average return being roundly stated at about fifty bushels of seeds per acre. In Russia, where the sunflower is most extensively cultivated, the seeds are eaten raw or cooked, or used for the extraction of oil, which is said to be excellent for table use and may be substituted for salad or olive oil, for all domestic purposes. The seeds are also of considerable value as food for birds, and are largely used in America for fattening poultry. The oilcake which remains after expression of the oil forms a valuable cattle food, being of great nutritive value and easily digested, while the leaves and stalks also possess highly nutritious properties.

THE ARGENTINE ANT : A SERIOUS PEST.

Entomologists in California regard the Argentine ant as a very serious matter indeed. It is astonishing that a pest so insignificant in size and which does not conceal itself, but come boldly into the open and, indeed, actually into the houses, should be so exceedingly difficult to suppress. Mr. John Isaacs, writing in the *California Cultivator*, says:—

“A recent visit to the ant laboratory of the University of California, located at Fruitvale, and in charge of Professor C. W. Woodworth, was a revelation in regard to the newly-discovered pest—the Argentine ant. Professor Woodworth has located his laboratory in the midst of one of the worst infected sections in the State, and certainly he has abundant material to work on. This pest is a very minute member of the ant family, but it increases in such enormous quantities that nothing can stand before it. It is exceedingly pugnacious and kills out all other species which it attacks. This might be beneficial, were it not that it is so much worse than any of our native species that these seem almost like beneficial insects compared with it. Other ants live in detached colonies and will not tolerate strangers in their midst, whereas with these there is no line of demarcation between one colony and another and all intermingle freely together, forming a practically continuous colony over the whole area where they are found.

It is a most serious household pest and none of the precautions which will check our common species has any effect on them. Furniture legs set in water will stop other species from reaching the tops, but these either cross on a slight dusty film or soon make a bridge of their bodies, across which others can pass. Coal oil will not check them, and so far nothing has been found which will effectively check their spread. It is a threatening danger to the horticulturist and floriculturist, from the fact that it attacks and de-

stroys the vital parts of the bloom, very much as do the thrips. At New Orleans, where this pest has existed for several years, it has killed out the cut-flower business, while in many places it has greatly reduced or destroyed the orange crop through its destructive work on the blossoms. Professor Woodworth drew the writer's attention to an acacia tree badly infested with cottony cushion scale, upon which no sign of *redalia cardinalis* could be seen, a most unusual thing, now that this lady-bird is so widely established but which was accounted for by Professor Woodworth's statement, that the ant attacks the young lady-bird larvae, but spreads the scale for the sake of its sweet exudation. If this is the case, there may be danger ahead from the increase of this old-time pest of our orange groves. In any event, the ant is already a most serious pest where it has obtained a foothold, and it has been reported from a number of widely-separated points in the State. Professor Woodworth is doing excellent work on this pest, and should be enthusiastically seconded in his work by all who are in the line of danger from this new pest."

MARKET REPORTS.

GENERAL SUMMARY.

FARM PRODUCE.

The holidays interrupted regular market conditions which with the progress of the month, have returned to their normal course. Chaff has assumed a firm tone, prime quality realised an average of, f.a.q., £4 10s. to £4 7s. 6d. Medium grades received less attention, buyers' demands being limited.

The wheat market has been light and fluctuating, prices being nominally between 3s. 5½d. and 3s. 6d., which is much lower than at last month's report. Oats arrived in light supply, feed fetched 2s. 3d. and 2s. 4d.

LIVE STOCK.

The market has livened and general demand has improved, but local sellers have held back. The following prices have been obtained:—

Sheep.—Fat ewes, 12s. to 14s. 9d. and 15s. 11d.; lambs, 8s., 11s. 7d.; and 16s. 3d.; wethers, 12s. 6d. 14s. 4d. and 16s.; store ewes, 6s. to 9s. 1d.; store lambs, 7s. to 7s. 1d.

Pigs.—Porkers, 16s., 20s., and 26s. 6d.; slips, 16s.; weaners, 8s. and 9s.

Horses.—Draughts, £18, £22 10s. to £28; hacks and light, £5 to £8.; ponies, £2.

Cattle.—Prime bullocks, £10 10s.; good, £8 10s.; poorer, £6.; cows, £5 5s. to £6 15s.

FRUIT AND VEGETABLES.

Vegetables and Fruit in heavy supplies, with good prices for good qualities. Following are prices for principal lines:—

Fruit.—Apples, best, 6s. 6d. to 11s. 6d.; inferior, from 2s. Pears, 8s. 6d. to 13s.; inferior, from 4s. Peaches, 15s. to 24s.; others, from 7s. Apricots,

9s. to 14s.; over-ripe and inferior, from 4s.; quarter cases, 3s. 6d. to 5s. 9d. Nectarines, 10s. to 14s. 6d.; quarter cases, 5s. to 8s. 6d. Plums, 9s. to 14s. 6d.; others, from 6s. 6d.; quarter cases, 3s. 6d. to 8s. Figs, 3s. 6d. to 7s. 3d.; Strawberries, 4s. 9d. to 7s. Tomatoes, best, 3s. to 7s.; others, from 1s. quarter cases, 2s. to 4s. 6d. Lemons, 6s. to 10s. 6d. Passions, 17s. to 21s. Melons, water, 9s. to 15s. 9d.; rocks, 5s. to 5s. 6d.; small from 1s.

Vegetables.—Cabbage, 8s. to 13s. 3d.; others, from 3s. 6d. Pumpkins, I.B., 5s. to 7s. 6d.; Turk's Cap, 4s. to 5s.; marrows, 1s. 6d. to 1s. 9d. Cucumbers, 6d. to 11d.; small from 2d. Peas, $3\frac{1}{4}$ d. to $4\frac{1}{4}$ d. French beans, $3\frac{1}{2}$ d. to $4\frac{1}{4}$ d.; inferior, from 2d. Carrots, 9d. to 1s. 4d.; small, from 6d. Parsnips, 2s. 6d. Lettuce, 7s. to 1s. 4d. Rhubarb, $\frac{1}{2}$ d. to $1\frac{1}{2}$ d. Onions, white, 4s. 6d. to 7s. 9d.; brown 5s. to 8s. 6d. Potatoes, 5s. to 6s. 9d.; medium, from 3s.; small, from 1s.

POULTRY, ETC.

The market has not been so full as usual, values in consequence being higher :—

Poultry.—Cockerels, 5s. to 7s. 3d.; small, 2s. 6d. to 4s. 9d.; hens, 3s. to 4s. 9d.; ducks, 5s. to 7s. 3d.; geese, 8s. 3d. Eggs, 1s. 3d. to 1s. 7d.

LONDON PRODUCE MARKETS.

Messrs. W. Weddell & Co. report as follows under date, London, December 4 :—

Wool.—The sixth series of Colonial wool auctions, which began on the 24th ultimo, was attended on the opening day by a large and representative gathering of buyers. A good show of wool was put before them, and bidding began without any hesitation, every lot being eagerly competed for.

Merinos showed an advance of 5 per cent. to $7\frac{1}{2}$ per cent. for both scoured and grease, faulty scoureds in particular selling well. At this figure the sales have gone on steadily, a hardening tendency on greasies under strong American competition being noticeable, wools bought for that quarter making a full 10 per cent. over the last series prices.

Greasy crossbreds are rather limited in supply and all kinds sell well, half-breds fetching about $7\frac{1}{2}$ per cent. more money, and medium and coarse sorts 10 per cent. to 15 per cent. more than in October.

Slips, which are of good length at this time of year, and in slightly better condition than usual, are being well competed for at much the same advance as on grease, here again coarse sorts showing the most rise.

Scoured crossbreds, which were quite out of favour in October, are now in more demand at a 10 per cent. advance.

The tone of the market continues extremely buoyant and satisfactory, clearances are being made of all descriptions. Quite a feature of the sales is the strong competition from American buyers.

Offerings up to the 3rd inst. comprise some 90,700 bales, including 20,800 bales from New Zealand, 63,300 bales from Australia, and 1,300 bales from South America. About 87,000 bales were sold, of which 20,500 were of New Zealand, 62,300 of Australian, and 1,300 of South American origin.

The first series of sales, for 1909, begin here on 19th Jan., and arrivals to date amount to 19,000 bales, of which 4,800 bales are from New Zealand, 9,400 from Australia, and the balance from South Africa.

English Wheat.—The markets have been quiet, and the recent advance in values is difficult to maintain. The average price last week of 32/3 per imp. qr. marks an advance of 1/1 per qr. from the previous fortnight, but is 2/4 per qr. lower than at the same time last year.

Australian Wheat.—Ex. Store.—There is only a moderate demand, and slow progress is made with sales. We quote :—40/6 to 41/6 per 496lbs.

New Zealand Wheat.—Ex. Store.—We quote nominally :—Shortberry, 35/- to 36/- ; and Longberry, 37/- to 38/- per 496lbs.

Frozen Meats.—General Market.—The quantities of meat now being marketed at Smithfield are much in excess of current requirements. Home-grown sheep alone are slightly dearer at 6d. and 6¾d. for Scotch, and 5¼d. and 6d. for English. Arrivals of Dutch sheep, though showing some slight reduction, are still heavy, and quotations remain at the low range of from 4½d. and 5½d. per lb. Dutch lambs are quoted at 5d. and 5½d. per lb. Argentine chilled beef is very plentiful and being sold at low prices. Sides of States beef are realising only 4½d. and 5¼d. at Smithfield. At Deptsford, States cattle are being sold at £15 and £20 per head; and Canadian at £13 and £18. The scheduling of several ports in the United States, in consequence of foot-and-mouth disease, has not yet affected the market here, as supplies for the present and immediate future are so ample.

The market for frozen meats has remained quiet. In the case of mutton, the tendency is rather in buyers' favour. Lambs are selling only slowly at the moment; but the statistical position is strong, stocks of New Zealand lambs being practically exhausted, whilst arrivals from Australia to date are small, as compared with last year. Frozen beef is almost unsaleable in competition with chilled beef at present prices.

Mutton (Australian).—Arrivals amount to 29,661 carcasses during the fortnight. The demand for this description is still very limited, and it is only with difficulty possible to make sales at the present level of prices. Light weight sheep are quoted at 3 3/16d. and 3¼d., heavies realising about 3½d. per lb.

Mutton.—Arrivals amount to 29,661 carcasses during the fortnight. The demand for this description is still very limited, and it is only with difficulty possible to make sales at the present level of prices. Light weight sheep are quoted at 3 8/16d. at 3¼d., heavies realising about 3 1/8d. per lb.

Lambs.—Arrivals during the past two weeks amount to only 18,527 carcasses from Australia, 8,589 carcasses from New Zealand, and 7,388 carcasses from the River Plate. The retail demand is very slow, and has counteracted any benefit to the frozen lamb trade which might otherwise have resulted now that marketings of Continental mutton and lamb are not quite so excessively heavy. Canterbury lambs are quoted at 5½d. for under 36lbs., 5¼d. for 36/42 lbs., and (nominally) 4½d. for 42/50 lbs. The small quantities of Adelaide and Sydney lambs now available are meeting a slow demand. Best qualities realise 4¾d. and 4 7/8d.; medium 4½d. and 4 5/6d.; and inferior parcels 4¼d. per lb.

GARDEN AND FARM NOTES FOR FEBRUARY.

The usual heat and dryness of this month do not lend themselves to much garden work, except stirring up the soil and conserving as much moisture as possible. Ground for planting should be put in course of preparation for the rain, air and sun given to the sub-soil. Manuring can be entered upon, using accumulations from the stable or decomposed refuse matter. If seed is sown the soil must be kept free and in moisture to ensure germination, unless in swamp land. Young plants can be raised in moist localities in readiness for the rainfall. The following vegetable seeds can be sown where conditions are favourable:—

Asparagus, beans, broccoli, Brussels sprouts, cabbage, cauliflower, celery, French beans, mustard, onions, Scotch kale, Silver beet, turnips, early potatoes, and cucumbers. Ground should be prepared for early peas, broad beans, and carrots.

Flower Garden.—Early sowings of annuals in pots and boxes can be made. Sow in beds, balsam, calceolaria, cineraria, pansy, phlox, etc.; also begonias, petunias, and gloxinias.

The Farm.—On the farm sowings can consist of barley, Cape oats, lucerne, rape, rye, etc.

PUBLICATIONS RECEIVED.

Critical Revision of the Genus *Eucalyptus*. Part X. (J. H. Maiden.)
Kent on Romney Marsh Flock Book, 1908.

Annual Report, Department of Agriculture, Queensland, 1907-8.

Dry-land Agriculture (Department of Agriculture, U.S.A.).

Shipping and Oversea Migration. Federal Statistics.

Trade, Customs, and Excise Revenue. Federal Statistics.

Year-Book of Department of Lands, Java, 1907.

Root Parasitism, Department of Agriculture, India.

Varieties of Potatoes Grown in Central Provinces, India.

Fruit Canning and Bottling (N. S. Wales).

EDITORIAL REQUEST.

Correspondence and Queries are invited from subscribers and readers of the Journal on any subject of interest to agriculturists and other settlers on the land, either conveying useful information or seeking it. Suitable letters and contributions will be published and answers to queries given in the succeeding issue, if communications are received by the Editor not later than the fifteenth of each month.

Secretaries of Agricultural Associations, Societies, and Farmers' Clubs are kindly requested to supply corrections of the lists published in the Journal, such as changes of appointments, dates of shows and meetings, as well as any other items of interest.

Rainfall for the month of December, 1908, recorded at telegraphic stations in Western Australia, and averages.

STATIONS.	*Total for December, 1908, in points.	No. of wet days.	Average for December, 1908.	No. of Years Records.	STATIONS.	*Total for December, 1908, in points.	No. of wet days.	Average for December, 1908.	No. of Years Records.
TROPICS :					NORTH COOLGARDIE				
Wyndham ...	479	12	435	21	FIELDS :				
Turkey Creek ...	867	18	447	10	Sandstone ...	104	3	...	...
Hall's Creek ...	171	11	370	17	Wiluna ...	160	5	30	9
Fitzroy Crossing ...	182	8	315	14	Mt. Sir Samuel ...	109	2	51	7
Derby ...	409	7	496	22	Lawlers ...	37	4	44	11
Broome ...	626	9	377	18	Mt. Leonora ...	51	1	18	10
La Grange Bay ...	616	8	269	17	Mt. Malcolm ...	124	1	32	10
Wallal ...	...	...	210	11	Mt. Morgans ...	<i>Nil</i>	...	23	8
Condon ...	378	5	94	18	Laverton ...	39	5	80	8
Bamboo Creek ...	335	9	116	10	Murrin Murrin ...	65	2	39	9
Marble Bar ...	343	11	108	13	Yundamindera ...	98	2	42	7
Warrawoona ...	143	3	136	8	Kookynie ...	<i>Nil</i>	...	70	6
Nullagine ...	147	4	129	10	Niagara ...	12	1	38	11
Port Hedland ...	37	4	44	10	Menzies ...	<i>Nil</i>	...	41	11
Whim Creek ...	133	3	31	10	Mulline ...	<i>Nil</i>	...	65	6
Roebourne ...	22	2	14	21					
Cossack ...	64	3	26	26	COOLGARDIE GOLD-				
Fortescue ...	13	3	24	20	FIELDS :				
Onslow ...	75	1	20	22	Davyhurst ...	<i>Nil</i>	...	...	...
Winning Pool ...	240	2	47	10	Goongarrie ...	<i>Nil</i>	...	67	12
WEST COASTAL :					Broad Arrow ...	25	2	66	10
Carnarvon ...	<i>Nil</i>	...	4	25	Kurnalpi ...	1	1	40	11
Sharks Bay ...	<i>Nil</i>	...	4	14	Kanowna ...	<i>Nil</i>	...	57	12
Wooramel ...	21	1	27	9	Bulong ...	4	1	56	11
Hamelin Pool ...	<i>Nil</i>	...	2	22	Kalgoorlie ...	7	1	85	12
Northampton ...	2	1	16	26	Coolgardie ...	27	2	80	15
Mullewa ...	12	2	15	12	Burbanks ...	1	1	95	9
Geraldton ...	3	1	11	31	Widgemooltha ...	12	2	72	10
Greenough ...	<i>Nil</i>	...	17	26	Norseman ...	26	5	94	11
Dongarra ...	1	1	13	24	Boorabbin ...	<i>Nil</i>	...	82	13
Minginew ...	100	2	23	12	Southern Cross ...	11	2	52	18
Carnamah ...	4	1	31	20					
Dandarragan ...	10	2	48	10	S.W. COASTAL :				
Moora ...	<i>Nil</i>	...	37	10	Gingin ...	2	1	37	19
Walebing ...	4	1	45	24	Kalamunda ...	30	1	...	...
New Norcia ...	11	2	49	25	Guildford ...	7	1	50	28
MURCHISON FIELDS :					Perth Gardens ...	10	2	61	32
Peak Hill ...	38	3	48	10	„ Observatory	11	2	35	11
Abbotts ...	20	2	24	9	Fremantle ...	11	3	58	30
Gabanintha ...	57	2	42	8	Rottneest ...	7	2	45	26
Nannine ...	107	2	37	13	Rockingham ...	7	2	43	10
Cue ...	90	3	38	13	Jarrahdale ...	29	2	65	25
Day Dawn ...	102	3	27	12	Mandurah ...	11	1	56	18
Lake Austin ...	28	1	25	10	Pinjarrah ...	10	1	68	29
Lennonville ...	57	2	50	7	Collie ...	20	2	64	8
Mt. Magnet ...	52	2	23	13	Bunbury ...	12	3	69	31
Yalgoo ...	31	1	26	11					
Murgoo ...	54	2	16	19					

*100 points=1in.

RAINFALL—continued.

STATIONS.	*Total for December, 1908, in points.	No. of wet days.	Average for December, 1908.	No. of Years Records.	STATIONS.	*Total for December, 1908, in points.	No. of wet days.	Average for December, 1908.	No. of Years Records.
S.W. COASTAL—con- tinued.					S.W. INLAND—con- tinued.				
Donnybrook ...	20	2	68	7	Arthur ...	11	3	48	17
Busselton ...	12	3	55	27	Wagin ...	17	2	46	17
Cape Naturaliste ...	21	4	...	...	Katanning ...	10	4	63	16
Karridale ...	82	5	124	14	Broomehill ...	25	4	55	17
Cape Leeuwin ...	81	10	105	11	Kojonup... ..	47	4	65	23
					Greenbushes ...	19	4	104	15
S.W. INLAND:					Bridgetown ...	14	2	95	20
Kellerberrin ...	3	1	74	15					
Meckering ...	Nil	...	59	10	SOUTH COASTAL:				
Newcastle ...	5	1	29	28	Mt. Barker ...	243	10	98	21
Northam ...	5	1	27	27	Albany ...	224	10	113	31
York ...	2	1	46	31	Breaksea ...	144	9	124	18
Beverley ...	Nil	...	40	25	Bremer Bay ...	45	4	93	23
Brookton ...	...	...	...	...	Hopetoun ...	22	2	144	6
Wandering ...	7	3	74	19	Ravensthorpe ...	40	4	129	6
Pingelly ...	5	1	63	17	Esperance ...	44	4	93	24
Narrogin ...	1	1	48	16	Israelite Bay ...	24	5	55	23
Marradong ...	11	3	48	10	Balladonia ...	13	3	64	17
Williams ...	8	4	49	23	Eyre ...	19	3	40	23

*100 points=lin.

REMARKS ON THE RAINFALL FOR DECEMBER, 1908.

The rainfall during the month has been in excess of the average in the East Kimberley district, from Wyndham South to Turkey Creek and throughout the North-West division, with the exception of Fortescue. The greater portion of the fall occurred between the 6th and 10th, in connection with a disturbance which came in on the North-West coast and passing overland through the Murchison, causing moderate to heavy rain there, and extending Southwards to Minginew in the West coastal district, the remainder of the month scattered thunderstorms were almost of daily occurrence in the Tropics, particularly on the 18th and 23rd. The excess was also noticed throughout the greater portion of the Murchison Goldfields and the Northern portion of the North Coolgardie fields, as well as on the South coast between Mt. Barker and Albany, heavy rain being recorded at the two latter places on the 7th. Throughout the South-Western portion of the South and Coolgardie Goldfields, the monthly falls have been below the average. The greater portion of the rain on the South coast was recorded from the 4th to the 7th, whilst throughout the South-West and Coolgardie fields only light scattered showers have been registered, with the exception of the 15th, when light to moderate general rain was recorded.

No rain has fallen over the Coolgardie Goldfields since the 15th.

Published by authority under the direction of—

H. A. HUNT,
Commonwealth Meteorologist.

Rainfall in Western Australia during the Year 1908.

(FROM TELEGRAPHIC REPORTS.)

STATIONS.	*Total for 1908, in points.	No. of Wet Days.	Average for previous Years.	No. of Years Records.	STATIONS.	*Total for 1908, in points.	No. of Wet Days.	Average for previous Years.	No. of Years Records.
TROPICS—					NORTH COOLGARDIE				
Wyndham ...	1531	54	2808	21	FIELDS—				
Turkey Creek ...	3271	84	2941	10	Sandstone ...	925	49	...	...
Hall's Creek ...	1383	57	2140	17	Wiluna ...	1014	43	1078	9
Fitzroy Crossing ...	2262	49	2349	14	Mt. Sir Samuel ...	774	37	848	7
Derby ...	2999	42	2714	22	Lawlers ...	644	38	868	11
Broome ...	2395	38	2341	18	Mt. Leonora ...	573	36	804	10
La Grange Bay ...	1713	27	1983	17	Mt. Malcolm ...	665	36	778	10
Wallal ...	...	...	1583	11	Mt. Morgans ...	581	41	872	8
Condon ...	813	17	1454	18	Laverton ...	733	47	1043	8
Bamboo Creek ...	1837	36	1767	10	Murrin Murrin ...	614	40	875	9
Marble Bar ...	2221	42	1353	13	Yundamindra ...	822	39	910	7
Warrawoona ...	1031	24	1436	8	Kookynie ...	742	50	917	6
Nullagine ...	1094	40	1369	10	Niagara ...	648	38	800	11
Port Hedland ...	1088	21	1445	10	Menzies ...	1139	43	832	11
Whim Creek ...	1136	20	2276	10	Mulline ...	1273	55	1122	6
Roebourne ...	1024	17	1252	21					
Cossack ...	1125	16	1199	26	COOLGARDIE GOLD-				
Fortescue ...	917	25	1032	20	FIELDS—				
Onslow ...	1059	21	813	22	Goongarrie ...	917	61	911	12
Winning Pool ...	1358	24	1153	10	Broad Arrow ...	1070	68	980	10
					Kurnalpi ...	1105	54	924	11
WEST COASTAL—					Kanowna ...	844	60	929	12
Carnarvon ...	1456	22	891	25	Bulong ...	880	49	918	11
Sharks Bay ...	1873	28	787	14	Kalgoorlie ...	998	52	942	12
Wooramel ...	1521	25	895	9	Coolgardie ...	1070	72	908	15
Hamelin Pool ...	1042	30	760	22	Burbanks ...	905	48	1020	9
Northampton ...	1573	56	2074	26	Widgemooltha ...	1157	77	1070	10
Mullewa ...	1270	52	1135	12	Norseman ...	1237	72	1034	11
Geraldton ...	1691	64	1766	31	Boorabbin ...	913	45	994	13
Greenough ...	1708	49	1946	26	Southern Cross ...	883	59	951	18
Dongarra ...	1708	50	1951	24					
Minginew ...	1438	60	1619	12	S.W. COASTAL—				
Carnamah ...	1361	51	1489	20	Gingin ...	2290	73	3044	19
Dandarragan ...	2293	65	2336	10	Guildford ...	2629	92	3348	28
Moora ...	1668	63	1764	10	Perth Gardens ...	2776	108	3318	22
Walebing ...	1852	72	1855	24	Perth Observatory	3052	107	3353	11
New Norcia ...	2043	82	2017	25	Fremantle ...	2634	111	2936	30
					Rottneet ...	2520	99	2817	26
MURCHISON FIELDS—					Rockingham ...	3210	93	3248	10
Peak Hill ...	739	57	1060	10	Jarrahdale ...	3860	96	4364	25
Abbotts ...	774	26	898	9	Mandurah ...	3613	103	3594	18
Gabinintha ...	875	32	875	8	Pinjarrah ...	3591	92	3835	29
Nannine ...	918	38	772	13	Collie ...	3404	112	3661	8
Cue ...	1357	44	807	13	Bunbury ...	2798	107	3655	31
Day Dawn ...	1192	35	721	12	Dornbrook ...	3466	110	3700	7
Lake Austin ...	1397	37	814	10	Busselton ...	3335	128	2979	27
Lennonville ...	1288	50	874	7	Cape Naturaliste	3132	134	3265	4
Mount Magnet ...	1188	46	720	13	Karridale ...	4719	151	4131	14
Yalgoo ...	1010	38	852	11	Cape Leeuwin ...	3577	192	3625	11
Murgoo ...	1275	33	722	19					

RAINFALL.—continued.

STATION.	*Total for 1908, in points.	No. of Wet Days.	Average for previous Years.	No. of Years Records.	STATION.	*Total for 1908, in points.	No. of Wet Days.	Average for previous Years.	No. of Years Records.
S.W. INLAND—					S.W. INLAND—con-				
Kellerberrin	1074	48	1186	15	tinued.				
Meckering	1955	46	4114	10	Greenbushes	3337	120	3720	15
Newcastle	1802	57	2075	28	Bridgetown	2994	125	3298	20
Northam	1425	60	1620	27					
York	1416	62	1733	31					
Beverley	1660	58	1527	25	SOUTH COASTAL—				
Wandering	1892	86	2394	19	Mt. Barker	2931	136	2683	21
Pingelly	1394	70	1681	17	Albany	3319	174	3513	31
Narrogin	1762	80	1881	16	Breaksea	2854	197	2844	18
Marradong	2226	92	2855	10	Bremer Bay	3432	123	2298	23
Williams	1665	91	2142	23	Hopetoun	2254	102	1980	6
Arthur River	1618	76	1869	17	Ravensthorpe	1456	102	1528	6
Wagin	1642	71	1713	17	Esperance	2819	111	2513	24
Katanning	1454	86	1749	16	Israelite Bay	1614	124	1451	23
Broomehill	1458	91	1841	17	Balladonia	1154	78	971	17
Kojonup	2103	87	2197	23	Eyre	1514	81	1089	23

* 100 points = 1 in.

REMARKS ON THE RAINFALL FOR THE YEAR 1908.

Commencing with the northern portion of the State, it will be noticed that, whereas Wyndham is nearly 13 inches and Hall's Creek eight inches below the mean, yet practically the remainder of the East and West Kimberley divisions are in excess of the average. The excess in the Turkey Creek district is due to the very heavy downfall which it received in February, whilst the excess in the West Kimberley arises from the March and April rains, both these months being greatly above the average. Continuing southwards, we find the northern portion of the north-west division, as far south as Marble Bar, is also in excess, Marble Bar being eight inches above: this appears to be quite local, as Bamboo Creek to the north only shows a slight excess, while Warrawoona, to the south, shows a large deficit. The remaining portion of the north-west division is below the average, Whim Creek being the greatest sufferer to the extent of over 11 inches.

The Gascoyne division, excepting Gabinintha, northwards to Peak Hill, is in excess, as is also the central portion of the Coolgardie goldfields and the whole of the Eucla division.

Coming to the south-west it will be seen, that, excepting a few scattered stations, it is below the average. The exceptions include Mullewa, a narrow strip lying between New Norcia, Meckering, and Beverley; Mandurah, and a small portion of the extreme south-west between Busselton and Karridale, and Mt. Barker and Bremer Bay. This latter shows an excess of some 11 inches above the average.

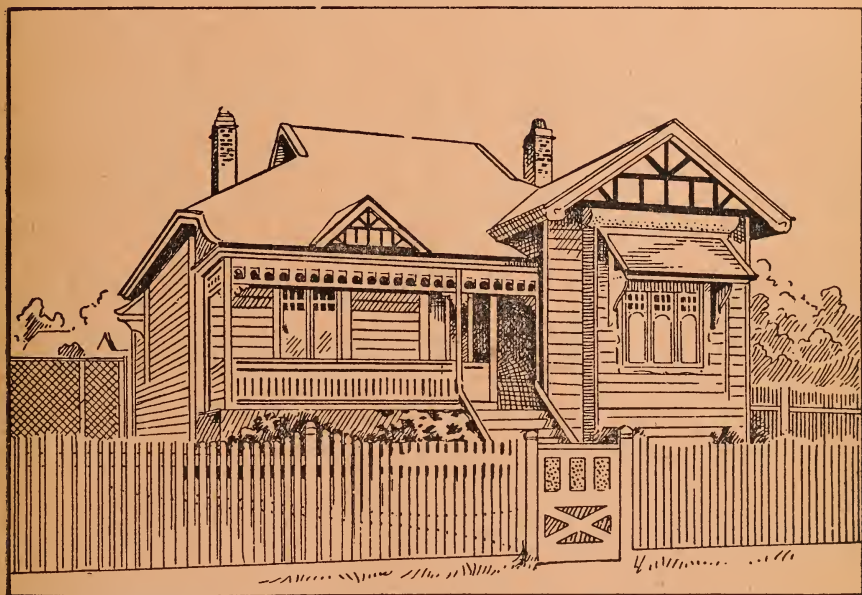
Published by authority under the direction of—

H. A. HUNT.

Commonwealth Meteorologist.

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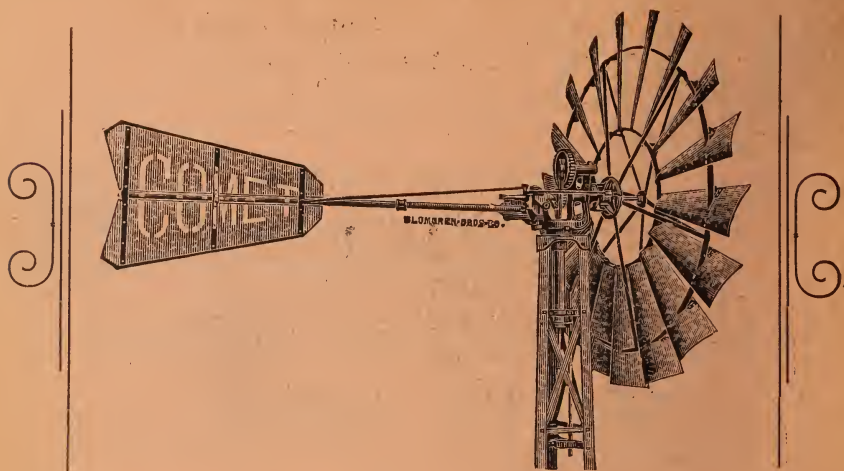
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MAYLANDS
CLAREMONT
BOULDER

RAVENSTHORPE
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10 foot Mill on 30 foot Tower	24	10	0
12 foot Mill on 20 foot Tower	31	0	0
12 foot Mill on 30 foot Tower	34	0	0

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AGRICULTURAL AND OTHER SOCIETIES.

SOCIETIES AFFILIATED WITH THE ROYAL AGRICULTURAL SOCIETY OF W.A.

SOCIETY.	SECRETARY.
Albany Agricultural and Horticultural Society	T. P. Hanley, Albany
Beverley Agricultural Society	W. Townsend, Beverley
Cannington Agricultural and Horticultural Society	R. G. Jennings, Cannington
Geraldton Agricultural Society	J. Cassel Brown, Geraldton
Great Southern Pastoral and Agricultural Districts' Society	W. W. Brunting, Katanning
Greenough Farmers' Club	R. J. Knox-Peden, Greenough
Irwin Districts Agricultural Society	F. Waldeck, "Bonniefield," Dongarra
Jandakot Agricultural Society	William Shepherd, Post Office, Jandakot
Jarrahdale and Serpentine Agricultural Society	W. J. Watson, Mundijong
Kelmscott Agricultural Society	Wm. McCallum, Kelmscott.
King River Agricultural Society	
Kojonup Agricultural Society	A. J. McGrath, Kojonup
Lower Blackwood Farmers' and Graziers' Association	P. D. E. de Néve, Lower Black- wood
Moora Agricultural Society	
Mt. Barker Rural Association	J. R. Parker, Mount Barker
Murray Agricultural Society	J. D. Paterson, Pinjarra
Narrogin-Williams Agricultural Society	R. Uren, Narrogin
Nelson Agricultural Society	T. Rossiter, Bridgetown
Northam Agricultural Society	V. H. Spencer, Northam
Pingelly-Mourambine Agricultural Society	A. A. Kent, Pingelly
Royal Agricultural Society of W.A.	Theo. R. Lowe, Perth
Southern Districts Agricultural Society	Percy Smith Bignell, Busselton
South-West Central Agricultural and Horticultural Society	F. H. Layton, Donnybrook
Swan Agricultural and Horticultural Society	R. J. Wilson, Guildford
Toodyay Agricultural Society	A. James, Newcastle
Wagin-Arthur Districts Agricultural, Horticultural, and Industrial Society	J. C. H. Nenge, Wagin
Wellington Agricultural and Pastoral Association	W. S. Hales, Bunbury
Williams Agricultural Society	J. H. Bailey, Williams
York Agricultural Society	E. J. Spark, York

UNAFFILIATED SOCIETIES.

Albany and District Settlers' Association	J. Mowforth, Albany
Albany and King River Settlers' Association	E. H. Playne, King River
Armada Progress Association	John Gould, Armada
Balingup Farmers' Association	P. V. Mauger, Balingup
Bedfordale Agricultural and Horticultural Society	T. W. Ottaway, Bedfordale,
Boyanup Farmers' and Progress Association	W. Eccleston, Boyanup
Boyp Brook Agricultural and Vigilance Committee	Wm. Vincent, Boyp Brook
Brmswick Farmers' Association	John Partridge, Brunswick
Bullsbrook Progress Association	D. Strachan, Bullsbrook.
Capel Farmers' Association	C. J. Rooney, Capel.
Central Fruitgrowers' Association	A. Barratt, Perth
Coogee-Spearwood Agricultural and Horticultural Society	E. Barton, Hamilton-road, Spear- wood
Cookernup Farmers' Progress Association	A. L. Cunnold, Cookernup
Dangin-South Caroling Progress Association	W. G. Haines, Caroling, East Beverley.
Darling Range Horticultural Society	A. C. Armstrong, Sawyers' Valley
Deepdale Farmers' and Fruitgrowers' Association	Chas. M. Lukin, Newcastle
Denmark Settlers' Association	H. V. Buckley, Denmark
Drakesbrook Agricultural Association	H. McNeill, Drakesbrook
Esperance Agricultural, Horticultural, and Floricultural Society	R. H. Dean, Esperance
Fremantle Horticultural Society	A. Haselgrove, 129 Stirling-street, Perth
Goldfields Dog, Poultry, and Horticultural Society	J. A. McNeill, Coolgardie
Goldfields Agricultural Society	Monmouth Smith, Kalgoorlie
Goomalling Farmers' Association	W. Gray, Goomalling, via Northam
Greenhills Farmers' Club	James McManus, Irishtown
Greenough Farmers' Association	J. McCartney, Walkaway
Harvey Farmers' Club	W. E. Ash, Hon. Sec., Harvey
Harvey Citrus Society	Kenneth Gibson, Harvey
Horticultural Society of W.A.	L. S. Dean, c/o Messrs. Sandover and Co., Perth
Jennapullen Agricultural Society	A. C. Morrell, Jennapullen
Jurakine Agricultural Society	W. Hayward, Jurakine
Kalamunda Horticultural Society	A. Sanderson, Kalamunda
Lake Pinjar Agricultural Association	H. Hartman, Pinjar
Mandurah Progress and Agricultural Association	C. Tuckey, Mandurah
Marbellup and District Settlers' Association	F. Mullineaux, Evergreen Valley, Marbellup, G.S.R.
Monwongie Progress Association	E. A. Batt, Monwongie, Popan- yinning
Moonyoonooka Farmers' Association	W. H. Williams, Moonyoonooka
Murray Agricultural Society	Miss M. Alderson, Pinjarra

SOCIETY.	SECRETARY.
Newcastle Branch Bureau	W. A. Demasson, Newcastle
Newtown Progress Association	T. A. Thurkle, Woodlands, Vasse
North Greenough Farmers' Association	W. F. Stansfield, Bootenal
North Lake Progress Association	A. R. F. Johnston, c/o W. Lyons South Road, Fremantle
Parkerville Agricultural Society	S. Ramsay, Parkerville
Plantagenet Beekeepers' Association	Vacant.
Popanyinning Progressive League	F. R. Bayliss, Popanyinning Pool, G. S. Railway
Preston Progress Association	T. B. Jones, Preston
Quindalup Progress Association	W. E. Carter, Busselton
Spearwood Progressive Association	R. Barton, Hamilton-road, Spear- wood, Fremantle
Talbot Progress Association	O. Ryan, York
Thomson's Brook Progress Association	J. W. Padman, Thomson's Brook.
Toodyay Vine and Fruitgrowers' Association	W. A. Demasson, Newcastle.
Tenterden Agricultural Society	J. Lunt, Tenterden
Upper Chapman Farmers' and Fruitgrowers' Association	D. O'C. Kehoe, Narra Narra
Victoria Plains Farmers' Association	J. Halligan, Summer Hill, Victoria Plains
Waigerup Agricultural Hall Association	W. J. Eastcott, Waigerup
Wandering District Agricultural Society	W. B. Smithson, Wandering
Wanneroo Farmers' and Gardeners' Association	F. J. Hollins, Wanneroo
Waterloo Farmers' Vine and Fruitgrowers' Association	T. W. Harris, Waterloo
West Swan Producers' Association	J. H. Stone, Guildford
Wongamine Farmers' Club	G. W. B. Smith, Wongamine
Wonnerup Progress Association	P. S. Brockman, "Reinscourt," Busselton
Wooroloo Progress League	T. H. Ibery, Wooroloo
W.A. Beekeepers' Association	W. Potter, Goldsworthy Road, Claremont
Wagin Beekeepers, Poultry Fanciers, and Fruitgrowers' Association	F. A. Pfeiffer, Wagin.
West Albany Settlers' Association	Alfred Burvill, Grasmere, via Albany
West Coolup Progress Association	Stanley Caris, Pinjarra
West Pingelly Progress Association	J. J. Parker, Neta Vale, Pingelly.

POULTRY AND DOG SOCIETIES.

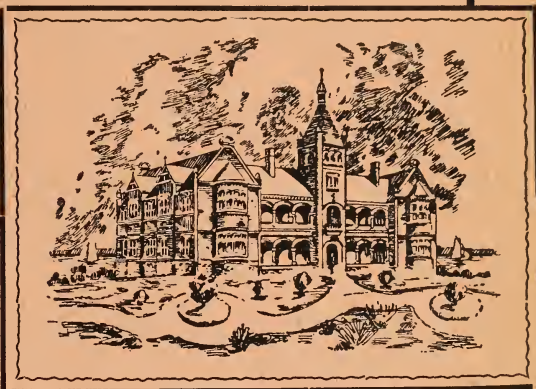
SOCIETY.	SECRETARY.
Albany	J. F. Cuddihay, Albany
Boulder	W. R. Rossiter, Boulder
Bunbury	E. Krachler, Bunbury
Claremont	C. H. Evans, Claremont
Collie	A. E. Smith, Collie
Coolgardie	J. S. Stewart, Council Office, Coolgardie
Fremantle	A. J. Parkin, Queen Street, Fremantle
Gingin	Chas. W. Johnson, Gingin
Kalgoorlie	H. R. Bristow, Kalgoorlie
Subiaco Poultry, Pigeon, and Cage Birds' Society	E. Austin, Hensman Road.
West Australian	Jas. Bolt, Hay Street.
West Australian Canary, Pigeon, and Bantam Club	Harry Barnett, 159 Barrack Street, City.
West Australian Minorca Club	E. J. Ford, Rockton Road, Claremont.

DATES OF MEETING OF SOCIETIES.

- Albany and District Settlers' Association—
At Torbay Junction.
- Armada Progress Association—
Last Tuesday in each month, at 8 p.m.
- Boyanup Farmers' and Progress Association—
First Saturday in each month.
- Brunswick Farmers' Association—
Wednesday preceding full moon, at 8 p.m., at the Agricultural Hall.
- Capel Farmers' Association—
Last Saturday on or before the full moon, at 8 o'clock.
- Greenough Farmers' Club—
January, April, July (annual), and October.
- Jarrahdale and Serpentine Agricultural Society—
Meet the Saturday preceding the full moon, at 8 o'clock p.m., at the Agricultural Hall,
Mundijong.
- Upper Chapman Farmers' and Fruitgrowers' Association—
Last Saturday in the months of December, February, April, July, August.
- W.A. Beekeepers' Association—
Second Wednesday in each month, Museum, Department of Agriculture, 7.30 p.m.
- Wanneroo Farmers' and Gardeners' Association—
Saturday on or before full moon, at Wanneroo State School.
- West Coolup Farmers' Association—
Second Saturday in each month, at 3 p.m., at Mr. Barry's residence.

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THIS is a Boarding and Day College. The attendance, at present, numbers 86 Resident Boarders and 106 Day Scholars.

The Students are always under supervision. The Boarders are not allowed to leave the precincts of the College without special permission.

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14 „ „ „ £25 „ ...	350	0	0
5 University „ „ £450 „ ...	2,250	0	0
1 „ „ „ £225 „ ...	225	0	0
2 Rhodes Scholarships (£900 each) ...	1,800	0	0
	£5,229	3	4

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- (a.) Ringbarking, clearing, fencing, draining, or water conservation.
- (b.) Discharging any mortgage already existing on holding; or
- (c.) The purchase of stock for breeding purposes,

ON THE SECURITY OF:—

- (a.) Holdings in fee simple; or
- (b.) Holdings under Special Occupation Lease or Conditional Purchase from the Crown; or
- (c.) Homestead Farms; or
- (d.) Such other real or leasehold property as the Trustees may think fit.

Advances may be made of an amount not exceeding £300 to the full value of the improvements proposed to be made.

Further advances may be made of an amount not exceeding £200 to one-half the value of the additional improvements proposed to be made.

No advance shall be made to discharge an existing mortgage to an amount exceeding three-fourths of the value of the improvements already made on the holding. The improvements recognised for this purpose are :—Ringbarking, clearing, fencing, draining, and water conservation. Advances are not made for "completion of purchase"; liabilities which have been incurred in the development of the security only being recognised.

At no time shall the advances to any one person (or number of persons if borrowing conjointly) exceed the sum of £500, and no sum exceeding £100 shall be advanced to any one person for the purchase of breeding stock. In applications for this purpose, the condition and capability of the security to successfully carry stock is of paramount importance.

Persons under 21 years of age, being unable to legally mortgage, are debarred from borrowing from the Bank.

Every application for an advance must be made on the Bank's forms, and shall contain all particulars required thereon.

Applications may be for sums of £25 or any multiple thereof, not exceeding £500. Each application must be accompanied by a valuation fee of 1 per cent. of the amount applied for. No refund of fee is allowed after an inspection of the security has been made.

Mortgages are prepared free of charge, but borrowers are required to pay the statutory charges in connection with their registration. These are:—

- (a.) Stamp Duty of 2s. 6d. for each £50 of the amount of mortgage up to £300; and
- (b.) A registration fee of 5s. for each Conditional Purchase or Homestead Farm Block mortgaged.

The Leases or Occupation Certificate, as the case may be, together with the above fees, must be in the possession of the Bank before a mortgage can be prepared.

NOTICES OF APPROVAL are insufficient for this purpose.

Intending borrowers are requested to note that no advances except for the specific purposes of discharging liabilities, or for purchasing breeding stock, are made against improvements effected prior to date of application. Applications should, in every instance, be lodged prior to commencement of work, and moneys are then paid over in progress payments as the work proceeds.

Repayments of loans extend over a period of 30 years, except in the case of stock advances, which have a currency of seven years only. Interest is charged at the rate of 5 per cent. per annum. payable half-yearly.

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Are your Wife and Children fully provided for in case of your Death?
What would be their position with that advance from the Agricultural Bank undischarged?

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Policy effected in December, 1885, under Table A for	300	0	0
Bonus additions to 31st December, 1906	175	18	0
Full sum assured to date	475	18	0

And Bonuses will continue to be added each year.

Annual Premium, £5 15s. Total Premiums paid to 31st December, 1906, £126 10s.

In case of death, the Society would *Return* as Bonuses the *Total Premiums Paid*, with a further sum of £49 8s. added. The full sum assured, £300, would also be paid to the member's representatives.

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1. A Homestead Farm of 160 acres. Application fee, £1; survey fee, £3; stamp, 1s. Conditions: Personal residence for six months in each of the first five years after survey, or residence on C.P. lands within 20 miles. Boundaries: Half to be fenced within five years; the whole within seven years. Improvements: 4s. per acre must be expended in the first two years, 6s. per acre during next three years, 4s. per acre during last two years, making total of 14s. per acre in seven years.

2. Conditional Purchase Lands.—From 100 acres to 1,000 acres at from 10s. per acre, payable in 40 half-yearly instalments at the rate of 3d. per acre. Conditions: Personal residence for 5 years, one-tenth of boundaries to be fenced within two years, the whole within 5 years, and improvements to the full value of purchase money to be made within 10 years. Half the value of boundary fence may be allowed in estimating value of improvements. Conditional Purchase Lands may also be selected without the condition of residence, in which case the improvements in value must equal one and half the amount of the purchase money, but not exceeding £1-10s. per acre.

3. Land for Orchards, Vineyards, or Gardens, from 5 to 50 acres, from 20s. per acre, payable in three years. Improvements, including fence, to be completed in three years.

4. Full particulars as to conditions, areas, and further methods of obtaining land will be found in the pamphlet "Selector's Guide," obtainable on application to the undersigned.

5. Surveys are carried out by the State at half cost to selectors.

6. The Agricultural Bank renders monetary assistance to enable settlers to effect improvements when land has been substantially fenced.

7. On a selector proceeding to any district for the purpose of selecting land, the nearest Land Agent will supply all information, plans, and pamphlets, as well as a guide to conduct him to available land free of charge. In the event of an application for land being made, with the necessary deposit, a refund of railway fare may be obtained, if the deposit on land selected is equal to 50 per cent. more than the amount of the fare, and provided the application for refund is supported by a certificate from a Government Land Agent stating the place from which the selector proceeded for the purpose of selecting.

8. The Railway Department grants a special concession in the way of fares and freights for a new selector's family and goods, on production of a certificate of *bona fides* from the Lands Department. Any selector of an area of not less than 500 acres first-class land may obtain from the Lands Department an order for railway tickets and freight for his family, goods, and chattels, from the station nearest his present or late residence to the station nearest the land selected, the amount to be repaid to the Department by the selector by bills at 12 and 24 months, with 5 per cent. interest added; until the bills are paid the land cannot be transferred or mortgaged except to the Agricultural Bank.


9. Any new selector residing on his land can arrange passages for his wife and family to this State through the Colonial Secretary's Department.

10. Agencies are established at Menzies, Coolgardie, Kalgoorlie, Southern Cross, Cue, Northampton, Geraldton, York, Northam, Beverley, Newcastle, Bunbury, Katanning, Albany, Bridgetown, Busselton, Narrogin, Wagin, Pingelly.

R. CECIL CLIFTON,
Under Secretary for Lands.
Perth, Western Australia.

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AGRICULTURAL BANK.

* * * * *

Advice to Applicants

* * * * *



Intending clients of the Bank are requested to note the following directions, particularly with

regard to anticipating their requirements. By so doing much of the inconvenience from delays, which are at present unavoidable, may be obviated:—

DON'T DEFER making application until you are in financial difficulties. With ordinary foresight you should be able to anticipate your requirements by at least two or three months. If you are in any doubt as to being able to tide over the unproductive stages of development, put in an application before you start your improvements. If the request is a reasonable one you can confidently look for assistance, and, in the event of approval, the proposed work effected since date of application is paid for. It should be clearly borne in mind that the Bank does not pay against work done prior to that date.

As soon as you have lodged an application, see that the Leases or Occupation Certificate, as the case may be, of the security offered are in your possession, and ready for production when required. If these have not been issued you should apply at once to the Under Secretary for Lands.

Notices of Approval are not sufficient for the purpose of a mortgage.

No moneys can be paid over until a mortgage over the security offered has been completed. This is prepared free of charge and forwarded for signature as soon as an application has been approved in Executive Council, provided the security has in the meantime been completed, and a registration fee of 5s. paid on each Conditional Purchase or Homestead Farm block, with stamp duty of 2s. 6d. for each £50 of the amount of mortgage.

For further directions see page viii.

May be you like Saving Money?

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NOTE that little word KID; it does not mean the skin of the giddy baa lamb, but KID, good tough KID, with a glace surface, and it wears well with 2 big W's.

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WESTERN AUSTRALIA

FEBRUARY.

1909.

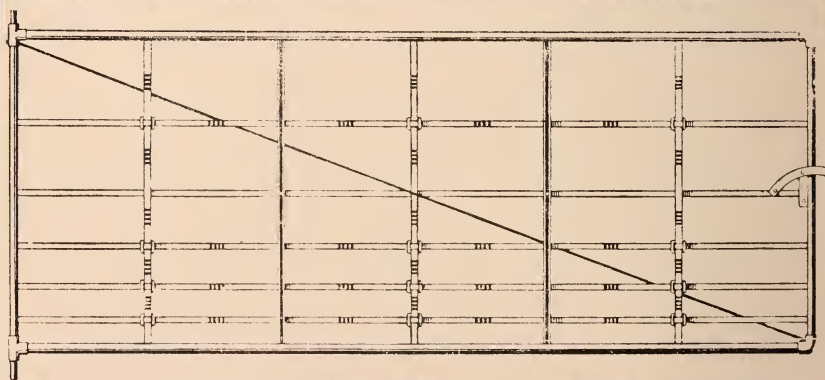
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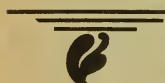
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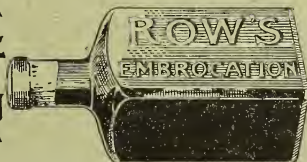
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OF THE

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OF

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By Direction of

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PUBLISHED MONTHLY.

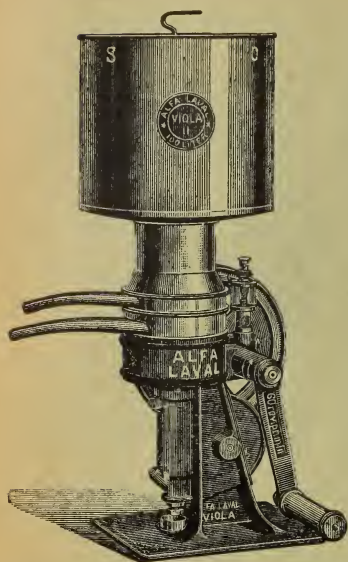
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" Lime... ..	0 10 0	0 5 0
" Sulphate	0 10 0	0 5 0
Complete analysis	1 10 0	0 15 0
Albuminoids	0 10 0	0 5 0
Oil	0 10 0	0 5 0
Fibre	0 10 0	0 5 0
WATER—		
For irrigation	1 0 0	0 5 0
Complete analysis	3 0 0	1 0 0
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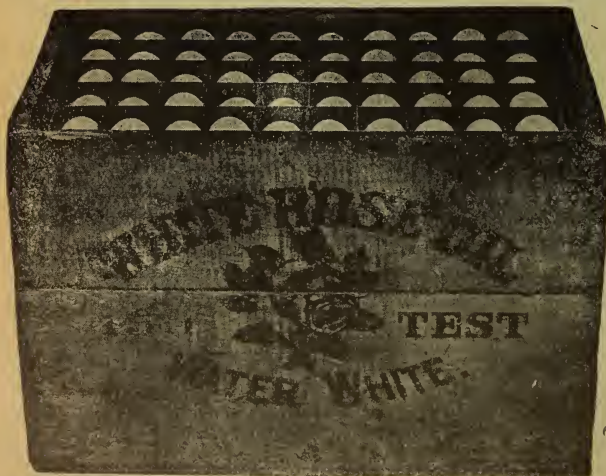
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Each Set would contain
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PRICE: 50 Sets or over,
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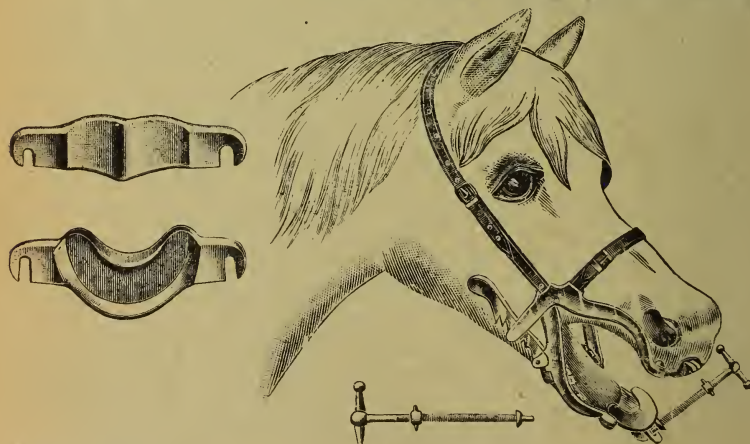
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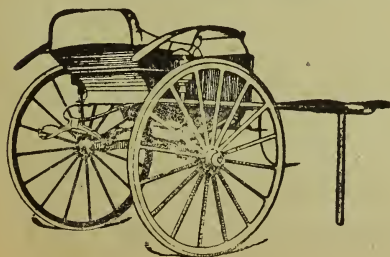
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University Primary or Preliminary...	94	Passes
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	£	s.	d.
19 University Prizes, amounting to ...	294	3	4
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5 University Exhibitions of £450 each ...	2,250	0	0
1 University Exhibition of £225 ...	225	0	0
2 Rhodes Scholarships (£900 each) ...	1,800	0	0
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Makes Cheapest, Strongest, and Most Satisfactory Fence.

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	Breaking Strain.	Length per cwt.	Cost per ton. Fremantle.	Cost per mile one wire. Fremantle. Wagin.
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ORDINARY GALVANISED WIRE, 8g. ...	1125lb. ...	528yd. ...	£10 ...	33/4 ... 40/8
"NEPTUNE UNRIVALLED," 14g. ...	730lb. ...	2240yd. ...	£20 ...	15 4 ... 17/7
ORDINARY GALVANISED, 14g. ...	720lb. ...	816yd. ...	£10/10 ...	22/8 ... 27/9

7 cwt. 12½ does as much fencing as 20 cwt. No. 8 ordinary wire.

4½ cwt. 14g. does as much fencing as 13 cwt. No. 10 ordinary wire.

THERE are imitations of "Neptune Unrivalled" on the market which are claimed to be "just as good." "Neptune Unrivalled" is the **only** wire that bears the manufacturer's guarantee of Breaking Strain and Length per cwt. Look for Brass Disc on each coil showing these figures, and the words "Neptune Unrivalled." None other is genuine.

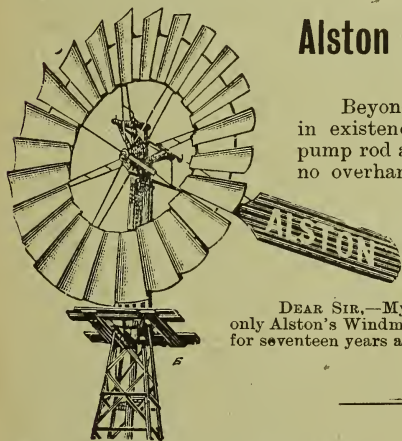
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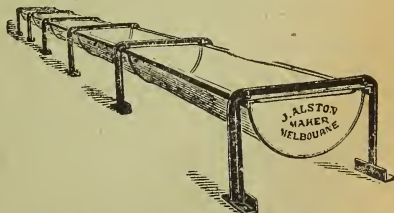
DEAR SIR,—My Manager on the Murchison Station requests that only Alston's Windmills be sent him, as he has one that has been in use for seventeen years and is as good as ever.

Yours, etc.,
(Signed) A. DEMPSTER, Muresk.

Alston's Patent Steel-framed Galvanised Stock Trough.

The Best Trough ever invented.
Will not crack, leak, rot, or rust.

All lengths. Write us your requirements. Pack in small space. Better and Cheaper per foot than the ordinary troughing. Send for Catalogue.



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of obtaining any fat at all from the milk after it has passed through the separator—it's greedy, and takes the lot.

We have a book which illustrates and tells you all about this Separator, and may be had for the asking.

It will mean more profit for you.

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JOURNAL
OF THE
Department of Agriculture
OF
WESTERN AUSTRALIA.

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Part 2.

NOTES.

Australian Mutual Provident Society.—Mr. Gavan Lucas, who for some time has acted as Resident Secretary for the A.M.P. Society in Western Australia, has been permanently placed in control of the Society's business in this State.

Pork-producing Ration.—The Wiltshire (Eng.) County Council has made experiments in pig-feeding and has placed on record its conclusion that the best pork-producing ration is composed of a gallon of skim-milk, or butter-milk, and 3lbs. of potatoes or barley meal per pig.

Rams for Sale.—The Department has the following well-bred rams for sale at Narrogin State Farm, at the prices named: Shropshire, six 2-tooth at £3 3s.; Lincoln, two 2-tooth at £3 3s., four 4-tooth at £2 12s. 6d.; Merinos, two 6-tooth at £3 3s., and eighteen 2-tooth at £4 4s. Applications must be made to the Manager at Narrogin.

Best cross for Freezers.—There is much controversy in New Zealand as to the best crosses for the fat lamb trade. A line of 1,232 was shipped through an agency. The Southdown cross averaged 34.62lbs. and 2.15lbs. fat; the English-Leicester 31.90lbs. with 1.94lbs. fat; and the mixed lot 31.76lbs. and 1.90lbs. fat. The lambs were straight off the hills without any artificial feeding.

Jubilee of Queensland.—We are in receipt of the Report of the Council of the National Agricultural and Industrial Association of Queensland, which contains the members' roll, prize donors, and audited statement of accounts for the year 1908. It is the intention of the Association to hold a great meeting in Bowen Park, Brisbane, on 7th to 21st August next in celebration of the Jubilee of the State.

Paspalum Seed.—To obtain good seed for laying down pasture lands is of great importance, one of the chief considerations being a grass of drought-resisting qualities. In our commercial pages Messrs. F. E. Randell & Co., produce merchants of 338 Wellington street, announce that they have been appointed agents in this State for Secombe's famous hand-shaken *Paspalum* seed, to which they draw the attention of farmers who are in quest of good fodder-producing seeds.

Egg-Laying Competition.—The current egg-laying competition terminates on the 31st March, and the Minister of Agriculture has decided to hold another one for twelve months, commencing on the 1st April, entries for which will close at the Departmental Office, St. George's Terrace, at 4.30 p.m. on Wednesday, 12th March. Entry forms may be obtained on application to the Under Secretary for Agriculture.

Handbook of South Australia.—We have to acknowledge receipt of a neatly bound, profusely illustrated volume, *The Handbook of South Australia*, issued by the Government of the sister State. The book contains 346 pages of letterpress and illustrations and is full of information of the progress of South Australia, its political history, the development of its pastoral, agricultural and mineral resources, and the growth of settlement, industries, trade, and commerce. It is a most interesting and useful publication.

Stock in Argentine.—In the Argentine at the present moment there are 29,116,625 head of cattle, 67,211,754 head of sheep, and 7,531,376 horses. There are 3,245,086 goats, 1,403,591 pigs, 465,037 mules, and 285,088 donkeys. The total value is set down at £129,370,000 sterling. The Argentine Minister for Agriculture intends applying to Congress for a vote to establish an office in London with complete staff, where information on agricultural and pastoral affairs of the republic can be obtained.

Rainfall at Denmark.—Many parts of this State enjoy a very copious rainfall throughout the year, which is very encouraging to settlers engaged in mixed agricultural pursuits. Denmark is particularly fortunate in this respect, as will be seen from the following record kept by Mr. John Ricketts, of that district, during the eight months ended 31st December last, and which he furnished to the Department:—There fell during May, 5.90 inches; June, 7.97; July, 4.48; August, 4.30; September, 3.71; October, 2.85; November, 2.13; December, 1.29. Total, 32.63 inches.

Tree-Pullers.—Agriculturists and others involved in the thorough clearing of lands should be interested in the Bunyip Tree-Puller, which is the very latest invention of the kind and carries with it all the improvements that previous machines lacked. It will pull the largest of trees out by the roots, and there are no iron rods or pins to break, which naturally saves all cost for repairs. It is portable within itself and may be wheeled into working position with the greatest of ease. Messrs. Geo. P. Harris, Scarfe & Co., Ltd., who are the local agents, are prepared to give a trial of the machine to intending purchasers.



MOODIARRUP DISTRICT.
Field of Oats, Hull's Farm.

Codlin Moth Parasites.—Codlin moth parasites which were introduced into New Zealand from California some two years ago, and a large number of which are being reared in Auckland by the Department of Agriculture, are now being distributed by the department to the several orchardists in the Auckland district (says an exchange). Information has been received that the insects are increasing to a great extent in districts where they have formerly been liberated, and this is taken as a sign that their introduction is likely to prove a great benefit in coping with a troublesome pest. A large number of the steel blue ladybirds, which devour scale blights of various kinds, are also being liberated in different portions of the Auckland district.

Medicine measure for Stock.—The size dose of medicine for stock varies with the age and size of the animal and construction of the stomach. Animals having compound stomachs, as cattle and sheep, require larger amounts than those with simple stomachs. A cow will need about twice as much and a sheep one-third as much as a horse. A drop is about equal to a grain; a teaspoon holds a fluid drachm; a dessert spoonful equals two drachms; a tablespoon holds a fluid ounce; a wine glass holds about two fluid ounces; a teacup holds from five to eight ounces; a tumbler holds from eight ounces to half a pint; a pint contains twenty fluid ounces.

Canning water.—Mr. A. W. Parker, of "Glenview," Cannington, submitted a sample of the water obtained in that district for examination as to its quality for irrigation purposes. Many of the residents held the opinion that the water contained some chemical constituent injurious to plant life. The following analysis has been obtained from Mr. E. A. Mann, Government Chemist:—

"Total solids	..	..	..	..	..	48.3
Salt	..	..	..	..	..	41.58
Hardness (temporary)	..	..	..	..	..	3.5 (degrees)
Hardness (permanent)	..	..	..	..	..	10.5

The figures represent grains per gallon. There are no substances in the water which would be injurious to plant life, and the sample is generally suitable for irrigation purposes."

Conservation of Fodder.—When it is considered the comparatively small area of land required to produce green fodder sufficient to fill a 100-ton silo (says *Dairy Notes*), it becomes all the more surprising that farmers, especially those whose livelihood depends upon their milk supplies, fail to grasp the great importance of the silo to them. Wheat and barley, for instance, will yield some eight tons of green stuff to the acre, panicle four or five tons, maize ten to fifteen tons, green lucerne that when cut would give three tons of hay would make ten tons of silage; and sometimes lucerne that is left on the field to rot during heavy rains might be turned into valuable fodder in the silo; and maize when it has not grained well is often allowed to run to waste which might be used as ensilage with great profit. To neglect these opportunities of preparing for possible dry seasons of more or less severity is to be culpably negligent, and those who neglect will have no one to blame but themselves.

Gummosis: Gum disease of Citrus Trees.—Gum disease is more common and destructive in citrus than deciduous fruits, possibly because the citrus trees are grown under more highly artificial conditions. The causes and the methods of prevention and treatment are the same wherever it appears. It is a functional non-infectious disease or interruption of the circulatory system of the tree, similar to that which causes the outbreak of a boil in a human being. In mild cases, if the boil is opened and cleansed, it will get well, just as the cherry tree usually gets well when the bark is slit and the wound cleaned out. But if the trouble is serious one general outbreak will follow another and, in the case of a tree, death may finally follow. This is so much more common in the case of citrus trees than in deciduous trees that as a really serious disease gummosis is considered mainly as a citrus disease. The gum is merely a symptom, not the disease itself. The disease is a functional disturbance, whose nature and cause is not yet well understood, which causes the nutriment in the cambium layer to turn into gum instead of wood and bark. Under pressure it finally breaks through the bark just as a boil breaks through the skin.

Analysis of Canadian soil.—Mr. Wm. Paterson brought with him a sample of rich prairie soil which he obtained from Regina, in the province of Saskatchewan, Canada, during his recent tour. This was submitted to the Government Chemist for analysis and gave the following result:—Nature, loam; colour, dark grey; reaction, slightly alkaline; apparent specific gravity, 1.23; absolute weight per acre (9in. deep), 2,507,970lbs.; fine soil, 100 per cent.

Proportion of Fertilising Substances.

	"Total" (soluble in strong hydrochloric acid).		"Available" (soluble in 1 per cent. citric acid).	
	Per cent.	Quantity in 1 acre of soil (9in. deep).	Per cent.	Quantity in 1 acre (9in. deep).
		lbs.		lbs.
Nitrogen	·425	10,609	...	...
Lime (C O)	1·250	31,350	...	...
Potash (K ₂ O)	·343	8,602	·225	5,643
Phosphoric Acid (P ₂ O ₅)	·160	4,013	·034	853
Chlorine	·07	2,896 (salt)	...	...

Such a soil would carry good crops for a number of years without manures.

TUBERCULOSIS.

DAIRYMEN'S ASSOCIATION.

A meeting of the Dairymen's Association was held in the lecture room in the Department of Agriculture on Thursday, January 28, when the intricate subject of tuberculosis was brought under treatment. Interesting papers were read by Mr. R. E. Weir, V.S., Chief Inspector of Stock, Dr. J. Burton Cleland, M.D., Medical Officer of the Central Board of Health, and Mr. J. A. Kinsella, Dairy Expert.

Mr. Weir's paper was as follows:—

BOVINE TUBERCULOSIS.

It affords me very great pleasure in meeting and discussing with you a subject which has caused many of you much anxiety during the past 12 months. If through any exertion of mine some little light can be thrown on this vexed question, so as to relieve the present tension and at the same time attain the end desired, namely, the eradication of tuberculosis from amongst your herds, then I shall feel satisfied.

Bovine tuberculosis is one of the very oldest diseases affecting cattle. It is spoken of in ancient history, and unless some specific is discovered which will cause cattle to become immune to the disease, it is likely to continue for ages yet to come.

Although prone to affect beef breeds, it is not so commonly found among that class as in the case of dairy herds. The latter are brought more under captivity, frequently confined during the milking period and highly nurtured so as to produce large quantities of milk in a given space of time. This prolonged strain upon the system induces lowered vitality, and consequently a greater liability to become attacked with disease, especially tuberculosis.

Some of our most eminent scientists have been studying this disease for many years, and in 1882 Koch discovered the bacillus which is the cause of the trouble. Further investigations bearing on the scientific aspect of the disease were continued with no lack of energy until some eight years ago when a Royal Commission was appointed consisting of five of the most eminent scientists of Great Britain, to inquire into and report upon certain set questions, the most important being:—"Whether the disease in man and animal is one and the same." This Commission set to work, and about 12 months ago issued their report, which showed that the cause of the disease in animal and man is one and the same.

The evidence which they brought to bear on the question appeared conclusive, and it was then thought that the matter was settled for all time. There was one person, however (others since have sided with him), who was not convinced, and that was Koch, who had previously publicly stated that there was no connection between consumption of man and animals, but on the contrary they were two distinct diseases. At the recent Inter-

national Congress on tuberculosis at Washington, Dr. Koch reiterated this opinion and proceeded to pick holes in the evidence of the Royal Commissioners, as given in their report.

Dr. Koch's conclusion is that human tuberculosis is almost non-virulent to cattle. Bovine tuberculosis is very virulent to cattle. Human tuberculosis has never yet been found in cattle. Bovine tuberculosis can exist in man, but it is only slightly virulent and remains localised. Eleven-twelfths of the victims die of the consumption form, and if the disease were communicable from cattle it could easily be found in the remaining one-twelfth. Yet, though the commissioners confined their attention to this one-twelfth only, they have not been able to prove transmission. It is therefore, pleasing to find that the most expert evidence goes to show that the cattle are not the cause of consumption among human beings, but apart from that, the disease in our herds and dairies causes directly or indirectly a certain amount of loss to cattle-owners. It is proved that the bacilli can only get into the milk when the cow's udder is affected, but all the same the total eradication of the trouble is well worth working for.

We will now consider what other countries are doing to stamp out this evil. In Great Britain a strong feeling exists at the present moment that legislation should be brought to bear with a view to stamping out the disease, and it is possible that the Government at an early date will take steps in this direction. In Denmark we find an eminent veterinary surgeon of the name of Bang has for many years been fighting this trouble, his system being segregation and the removal of calves from all affected animals immediately they are born, and fed on milk from healthy animals. This method has now been given a fair trial with the result that Bang, who was also present at the American Conference previously referred to, stated that his system had been the means of doing a great amount of good, but that on its requiring too continuous attention the farmers themselves were becoming tired of well-doing. In some of the States of America, and more particularly New York, legislation has been passed to assist dairymen and farmers who desire to have their herds tested, and compensation from 50 to 80 per cent. provided for any animals lost.

The Chief Veterinary Officer of Canada delivered a very able address before the Tuberculosis Congress at Washington, and stated that no general application of tuberculin test was made there—his reasons being that no intelligent method of dealing with bovine tuberculosis had been evolved, and that he deemed it wiser, before taking action, to await the results of further investigations. At that particular juncture he considered compulsory testing and slaughter unwise. He stated that many men whose zeal outruns their discretion advocate compulsory testing and slaughter of all re-acting animals. At first sight to men lacking practical experience, and perhaps devoid of responsibility, this policy may seem a very simple solution of the problem.

That it is very far from being so, however, needs but little demonstration. It was believed by many at one time that if a herd was tested and the reactors destroyed, including disinfection of the premises, that the disease was eradicated for all time. Unfortunately no greater fallacy could have been propounded, for according to the very nature of things it can only be assumed that a period of incubation exists when it is impossible to state if the animal is infected or not. This period has now been fixed at from

eight to 55 days. This fact vitally affects any tests that may be made, and in conjunction with replacements which have to be made to dairy herds in particular forms a serious obstacle to the satisfactory working out of a policy of compulsory testing and slaughtering even with liberal compensation. Taken in conjunction with the vagaries of tuberculin in repeated tests of the same herd, it is sufficient to exclude from the field of practical action the methods of dealing with tuberculous, excepting in small and circumscribed communities.

In the Eastern States testing was begun on an extensive scale some years ago, but the authorities gave the matter up, for the reason that it spelt ruin to the dairying industry which had cost them so much to foster.

Now, gentlemen, we come to our own future policy regarding this disease. It will be apparent to you all how difficult the problem is, but with your hearty co-operation it should not be insurmountable. It is no doubt the desire of each one of you to obtain a healthy herd, and this can only be secured by testing periodically.

All clinically affected animals, more particularly of the udder, should be immediately isolated and destroyed. Those reacting to the tuberculin test, but otherwise apparently healthy, should if possible be isolated from the remainder of the herd, but in the case of you dairymen this is practically impossible, and in that case there is no alternative but to run them with the herd until they are dry, when they should be fattened and disposed of to the butcher. No economic waste would then result, and no danger need be apprehended from the milk supply, seeing that the animals were free from any clinical lesions. All reactors require to be earmarked on the right, and non-reactors on the left ear as a distinguishing mark.

If careful supervision is exercised in this way the herds would in due course become practically speaking, free from this complaint. Our great obstacle however, is replacements, and more particularly as we are situated, having to import the majority of our dairy cattle from the Eastern States. Your Association has recommended to the Hon. the Minister for Agriculture the testing of all dairy cattle prior to shipment in the Eastern States. Under commercial conditions, this is practically impossible, for the following reasons:—Speaking generally owners of dairy herds in the Eastern States would not permit the test being applied, and in addition, a number are brought in the open market where the conditions are not permissible of application. After the consignment has been collected, they are usually shipped direct on the vessel for transportation to the West. Even if sufficient time were permitted for testing immediately before shipping, the animals would have to remain quiet for a few days in a suitable building so as to permit of the test being applied, and as the majority would be near calving, some difficulty would no doubt be experienced in getting a normal temperature. Should any re-acts occur, the shipper would then be at a loss, as it would be impossible for him to again resell the animal as healthy. Presuming however that they were tested and all had passed, it would be no criterion that the infection was not lying dormant in the system, and after a period, say of three months after importation, the test being applied again, a reaction follows.

Having satisfied ourselves of the difficulty of applying the test in the Eastern States, we will next consider the shipment on arrival at Perth. As you are all aware, these animals arrive either as having calved on board

ship or just on the point of calving. Under those conditions it is also practically impossible to apply the test, as the animals would have to remain for at least a fortnight, before regaining their normal state of health, and here again, we are met with the same obstacle, namely, period of incubation with such animals. Seeing the difficulties to be met with in connection with imported animals, it is evident that some other method of securing supplies will have to be considered if our herds are to be kept in a sanitary condition. In my opinion, the only satisfactory way is to breed our own supplies and from herds that are known to be practically free from this malady. This may be found somewhat difficult at first, but will be ultimately for our own good, and, generally speaking, for the State as a whole.

All importation of cattle excepting stud stock should be prohibited. With the latter it is possible to have them tested and declared clean. Under those conditions and combined with proper disinfection of premises where infected cattle have been stalled, it is possible in time to build up herds practically free from the disease.

In conclusion, gentlemen, I may state that much has yet to be learned regarding tuberculosis. Scientists are still feeling their way, and I am fully confident that before many more years have passed, a specific will be discovered which will be found easy of application, and prove a sure prevention against any economic waste such as occurs at present.

Dr. Cleland's paper:—

TUBERCULOSIS IN DAIRY HERDS.

Like human beings, dairy cattle are much subject to tuberculosis, the same organism, the tubercle bacillus, being the cause of the disease in both. Unfortunately, however, in human beings the disease, generally speaking, runs a more rapid course, and is more fatal than is the case in cows. When in either case the tubercle bacilli find a lodgment in any of the tissues of the body there they slowly multiply, irritate the part affected, and usually cause the formation of an abscess, sometimes as large as an infant's head, or of dense firm growth or a combination of the two. In cattle, the lungs are most frequently affected, and next to these the glands of the head. The intestines and udder are much less frequently diseased. It is necessary, of course, before an animal or man becomes affected with tuberculosis for such to have received the tubercle bacilli into their system from some other case of the disease. For tubercle bacilli do not spring up of themselves, nor are they found in Nature leading an independent existence apart from disease, but are always associated directly or indirectly with tuberculosis in some living being. It is obvious, therefore, that if we can prevent tubercle bacilli from entering the body of a man or of an animal, such a person or animal cannot develop tuberculosis. It is necessary then to see that all the channels by which these germs gain entrance are protected from infection by them. Tubercle bacilli may reach man either by inhalation into the lungs or in food. The danger from the latter is assuming more and more importance, since the discovery that the lungs can become infected by this channel without the disease appearing in the other parts of the body. There

are three common ways by which tubercle bacilli can enter the body in food. They are:—

1. By the food being soiled in some way by the spit of a consumptive (tuberculosis) person. Such people are always coughing, and the spit is loaded with bacilli. When the consumptive is careless these can easily get mixed with food, if such is handled by the patient.

2. By eating tuberculous meat. Thorough meat inspection in Western Australia reduces the likelihood of this almost to nil. Efficient cooking likewise minimises the danger.

3. By drinking milk containing tubercle bacilli. That milk frequently contains tubercle bacilli has been demonstrated time after time in England. That it at times does so here I know also by experiment. The fact stands forth then that not infrequently milk as delivered to the consumer contains tubercle bacilli. Two questions remain to be answered, viz., (1) Is this milk dangerous to human beings, and (2) if it is how do the tubercle bacilli gain entrance into the milk?

Is milk containing tubercle bacilli dangerous to human beings? This is a somewhat difficult question to give a direct answer to, on account of the long time that tuberculosis may take to manifest itself, even when the disease is apparent. We all know people who have been consumptives for many years. It may be months or even years perhaps after the entrance of tubercle bacilli into the system before the disease breaks out, and even then it might be only when the patient was run down, say, after influenza. We cannot expect then to find striking instances in which the disease—tuberculosis—can be directly traced to some particular dairy or cow. In looking for the cause we would have to go back perhaps many years, and know the histories of all the cows from which milk came. What we do know, however, is this, that tuberculosis in young pigs is always common when mixed milk from a dairy is given to them unboiled, or the separated milk, for instance, from a creamery. We further know that guinea pigs fed with such tubercular milk will develop tuberculosis. Here, then, is some *prima facie* evidence which strongly strengthens our suspicions of tubercular milk. Of course, it is highly probable that many of us from time to time do ingest living tubercle bacilli in milk without contracting the disease. It is likely that everyone of us has done so. There seems, in fact, to be something wanting in addition to ensure a person contracting tuberculosis. It may be that as a rule the dose is too small and only larger doses affect normal persons; it may be that a passing indisposition favours the germs, or it may be that fatigue is necessary.

How does tubercle bacilli gain entrance into the milk? At one time it was thought that tubercle bacilli would only be likely to be found in milk when there was tuberculosis of the udder. Everyone, of course, at once admitted the danger from a cow with tuberculosis of the udder. Later on, however, authorities began to think that the udder need not necessarily be affected with tuberculosis for the bacilli to appear in the milk. They considered, in fact, that at times tubercle bacilli, originating in other parts of the body—in tubercular abscesses, etc.—could find their way by the blood stream, and be excreted in the milk just as it is now known that in many cases of typhoid fever the typhoid germs are excreted by the kidneys in large numbers without the kidneys being actually diseased. Recently, however, another and much more dangerous origin for tubercle bacilli has been

indicated. It has been found that cows which in general appearance were in prime health, and which showed no clinical (i.e., distinguishable to the senses) evidence of disease, though they reacted to the tuberculin test (i.e., were really diseased, though the tuberculosis was hidden away in the internal parts), in some cases excreted living tubercle bacilli in their droppings. I have proved that this is the case too, in Perth in two cows out of four so tested. Such results mean much. They mean that, even if you exclude all animals with tuberculosis of the udder or all manifestly diseased cows from a herd, but leave those which have reacted (i.e., are actually though not visibly diseased), you leave animals amongst which are some who, in their droppings, are distributing tubercle bacilli with their power to spread disease. I am firmly convinced that it is by contamination of herbage and grass by such tubercular droppings that other cows in nearly all instances contract the disease. This alone should make dairymen anxious to get rid of such animals.

You may be quite willing to agree to this, and yet you may say, "What has that got to do with the milk?" Let me explain. Recently some samples of mixed milk from a dairy were obtained for me by one of the inspectors, who informed me that, during the milking, the requisites for cleanliness laid down by the Central Board of Health were rigidly adhered to. Yet, on centrifugalising the milk, in a couple of ounces, I found quite a marked deposit of dirt, which proved to contain vegetable matter stained with bile, i.e., consisted of cow's faeces. If these faeces contained tubercle bacilli—and a small amount may contain many—then such milk would be tubercular.

How did the faeces reach the milk? The udder was washed, the milker's hands cleaned. Nevertheless, small fragments of dung can easily fall off the side of the animal if it is not well-groomed, or be whisked in by the tail if this is free, or be carried by the wind, if the yard is unpaved or eddies of wind occur. The latter source, i.e., from dust, indicates that one tubercular animal, even though not milked but allowed in the yard near the shed, may be a danger to the whole milk. This, then, is, I think, the most fertile source of tubercle bacilli in milk, and at the same time the most difficult, perhaps, to deal with.

How can the danger be minimised? I can at present see only three ways, one of them almost impracticable, the other two beset with difficulties, but in the light of present knowledge, they must be strenuously aimed at. The three methods are:—

(1.) Removal of all tubercular animals (i.e., all reacting to the tuberculin test, whether clinically affected or not) from dairy herds. This at once gets over the difficulty, but entails initial loss to the dairyman, though it pays him much better in the end.

(2.) Pasteurisation of milk from every dairy not dealt with as under: Proper pasteurisation (one hour at 150deg. F.) will kill the tubercle bacillus. In fact, milk containing such dead tubercle bacilli has, perhaps, an advantage over ordinary milk free from such bacilli, inasmuch as the ingestion of the dead bacilli may make the individual more resistant to the living.

(3.) Elimination of all obviously diseased cows and collection of the milk from the remainder under conditions of surgical cleanliness. This would not eliminate all danger, but most of it. Needless to say, the expense of thus obtaining milk would be so great as to preclude the utilisation of this method.

What part do other germs play in the question of pure milk? The infant obtains practically germ-free milk from its mother. So does the calf from the cow. Such milk is a complete food, containing all the elements necessary combined in suitable proportions. Naturally, the consumer of milk should receive it in a condition as little changed as possible from that which the infant or calf receives. How can they do so? By obtaining the milk under the cleanest conditions possible (thus preventing dung or dirt containing germs entering it); by keeping it cool (thus preventing the germs that do fall in from multiplying rapidly); and by keeping it covered from dust and flies (thus preventing contamination).

What do germs do when they fall into milk? They multiply more or less rapidly according to the tubercles. They feed on the food constituents that man requires for his own food. Some convert the cheesy part into various simpler bodies; some split up the milk sugar into acid and gas; some alter the cream. Now, many of these are harmless, some are useful, others injurious. It may be said roughly that the injurious ones are those that come from dung or are carried in by flies (typhoid, for instance, in the latter case). Of those that fall in from the air, the chief is the lactic acid germ. This is often a very useful germ, and milk soured by it alone is an excellent and palatable article. The lactic acid germs also tend to oust other undesirable germs from the intestine, and by their use cases of gastro-enteritis are not infrequently now cured. It is further a useful germ since by souring the milk, it is a warning that other germs, some of which may be harmful, have also had time to multiply considerably, i.e., they indicate the age of the milk, or the fact that it has been dirtily obtained, or has not been kept cool. Now, pasteurisation has this good effect, that it kills off nearly all germs, whether desirable or not, and you start again with a clean sheet in the shape of clean milk in clean stoppered bottles. If you like, you can now add a few pure lactic acid germs, which will grow slowly, indicate the age of the milk and the way it is kept, and do no harm, but perhaps good.

THE MILK SUPPLY: USE OF PRESERVATIVES.

(By J. A. Kinsella, Dairy Expert.)

I.

Of late a great deal has been said and written with reference to the unhealthy animals and very primitive and unsuitable methods under which milk for human consumption is produced for delivery to the public. It is not with a view of adding to the many criticisms that have been uttered during the past fifteen months that I attempt to speak on this very vital question concerning the public health of the people of our State. Having had a wide experience in dairy school teaching and instruction work, as well as an opportunity of investigating the milk supply of cities in various parts of the world, such as England, Scotland, Denmark, France, America, Canada, Argentina, Africa, and the Australian States, I feel that I can speak with considerable practical knowledge. The main object of this paper is to en-

deavour to throw some further light on the practical as well as the scientific side of the matter under notice as it affects us in Western Australia. It may also tend to bring forth ideas that would assist in the improvement or work towards a solution of this important question. The problem of the milk supply has attracted, and continues to attract, widespread attention, not only in the large cities of Europe and America, but in the rural districts of those countries. People in Australia are fast awakening to the importance of following the lead of older countries. Too much praise cannot be bestowed on our medical men in Australia, for the efforts they are putting forward to ensure a pure food supply—including milk—for the protection of the people; more particularly the lives of infants.

During late years, infantile mortality in many countries in relation to vital statistics has been so alarming that medical and scientific men have given serious attention to the subject, and generally the conclusion arrived at is that the milk supply is responsible for an enormous loss of life.

This phase of the question may be more plainly recognised when it is considered that the food with which newly-born infants are fed for the first three or four months of their existence consists—in the majority of cases—of cow's milk. There are many causes which contribute to these young lives being deprived of their natural sustenance, but apart from this, it is a remarkable fact that one-third of the deaths of children in Europe and America occur during the first three months of infant life. It has often been demonstrated by scientific men that a large percentage of these lives could be saved simply by the means of rendering milk absolutely pure. As I have already stated, so much has been written on this subject that I need not quote many statistics. I had intended to quote particulars which I had in my possession regarding New York's city milk trade, pasteurisation and its remarkable effect on infantile mortality. They deal with the milk trade of this particular city in a manner which not only has a very important bearing on the question I am dealing with, but also in a way that should prove of educative value to our citizens. We need not go to the tropical climates where bacteria thrive and multiply more rapidly, and where methods of production are—in many cases—comparatively primitive and lax to find confirmation of the statistics referred to. In Scotland, where both science and practical skill have been for years combating disease in dairy cows, and improving the methods of production, we still find a startling state of affairs.

Prof. Loudon M. Douglas, dairy expert and authority on city milk supply, in a paper recently delivered before the members of the Co-operative Dairy Society of Wishaw, made the following statement:—"We find for example that in Scotland the infantile death rate is 128 per 1,000 births, and in the city of Glasgow the rate is 149. In the district of Wishaw it is about 116 per 1,000. When you compare these figures with the general figures given in our national vital statistics (i.e., from 1 to 60 years of age the death rate is only 7.5 per 1,000 on the average) you will see that there is an enormous discrepancy somewhere and which—it is thought—is traceable to the fact that there is a large consumption of milk of an impure character containing bacteria that convey disease that destroy young lives almost as soon as their existence has begun. The knowledge that bacteria exist is no new thing, but their all pervading presence is only now being fully realised and the invisible germs to the naked eye which we describe

collectively as "bacteria" are responsible for nearly all the ills which human flesh is heir to—in youth, in middle life, or in old age. The only difference in my opinion between modern and ancient practice in regard to these insidious germs lies in the fact that we now try to control them with enlightened knowledge and intelligence, whereas our forefathers had no means of arriving at such knowledge. One often hears the question put—How is it that our forefathers lived to such ripe old ages before bacteria was discovered? I think the answer to this would be that their plain sensible manner of living and dieting was largely responsible for prolonging their lives and not to the fact of the unexisting knowledge that they might be taking into their systems milk laden with disease producing bacteria, including the bacillus of bovine tuberculosis."

We are to-day, however, concerned more particularly in what applies to milk and our city trade, and I think it may be desirable if I first of all devote a little attention to what milk really is.

Milk, by reason of its nature and composition forms a most favourable medium for the growth and development of numerous germs of disease, many of which are communicable to human beings. This being so, and seeing that milk forms the main diet for our children, particularly in the early stages, and seeing that milk, in a large measure, enters into the food of adults, no effort should be spared on the part of those in authority to speedily take such steps as will prevent contamination from the moment the milk is drawn from the animals until it goes into consumption.

The composition of milk.—The constituents of milk are many and of diverse character. When milk is analysed, or separated into component parts the principal compounds found are water, fat, casein, albumen, sugar, and ash; there are, however, a number of other substances present in small quantities and which have a slight effect on the milk when used as a human food. The quantities of the different constituents in milk vary more or less. I quote the following findings by recent authorities in various countries:—

			Germany. Fleischmann. Per cent.	America. Babcock. Per cent.	England. Richmond. Per cent.	France. Cornevin. Per cent.
Water	..	..	87.75	87.17	87.10	87.75
Fat	..	..	3.40	3.69	3.90	3.30
Casein	..	..	2.80	3.02	3.00	3.00
Albumen	..	..	.70	.53	.40	
Sugar	..	..	4.60	4.88	4.75	4.80
Ash	..	..	.75	.71	.75	.75
			100.00	100.00	99.90	99.60

According to the highest authorities we have, there is rarely more than 88lb. of water found in 100lb. of milk. In the richest milks, however, as low as 86lb. or less is found. The average milk from cows may be said to contain 3.5 per cent. of fat, and it often runs up to 6 per cent. in the milk from some cows. Very often normal milk given from some cows is found to go below 3 per cent. of fat, and it has been found in few instances where the separate milkings from some cows, particularly the morning's milk, has only contained 2 per cent. of fat. There are many conditions which affect the quality of milk intended for human consumption. Some of these are, the

general health of the animals, the care they receive, the food, the methods of feeding, housing, cleanliness, etc. In the first place the milk for city and town supply should be of good quality, so far as the amount of cream or fat contained in it is concerned. Secondly, the milk should be procured only from healthy animals which are fed on pure food and kept in clean stables or byres. Thirdly, the milk should be treated in such a manner as to prevent the cream or butterfat separating from the other solids; it should not be allowed to undergo the process of fermentation; and what is most important, it should be clean. When cows are in a healthy condition and fed on fairly good food, there should be at least 3.5 per cent. of fat in the milk produced by the average herd. I am now speaking of the mixed milkings of the morning and evening; and when mixed is found to contain less than 3 per cent. of fat there is ground for suspicion of adulteration. I make this statement from long practical experience in milk-testing. At the same time it is desirable to point out that the fluctuations of the fat percentages in milk are in some cases very great. The variations in the fat percentages are influenced by a number of conditions such as change of food, drink, surroundings, treatment, etc., exposure, rough weather, excitement, and sickness, length of intervals between milkings, and improper methods of milking.

Milk as a food for human beings.—There is perhaps no food for human consumption that has a higher value than normal milk fed or taken in a pure state. The nutritious value of milk, however, it is feared, is very seriously impaired by the milk being produced and handled under uncleanly methods. In Great Britain the production of milk is the most important branch of the agricultural industry, with the exception of the production of meat. During the last fifteen years the production of milk has attained gigantic proportions in that country, on the Continent and America; particularly is this true regarding the quantities produced for human consumption in the large cities and towns. The old system of producing milk for city trade, by methods which were not calculated to give a pure article, and to which article were often added water, chalk, etc., has now in these countries given place to a more up-to-date and improved system under which a purer milk is produced and despatched to the consumer. Experiments have shown that milk is not a luxury, but a very economical food. It contains a large amount of digestible nutrients, and in the case of a number of diseases in human beings is the only food allowed by medical men. Milk containing either a maximum or minimum amount of fat is not, it is said, the best for human food purposes. Normal milk containing about 3 per cent. of fat generally gives the best results, where it forms a large portion of the diet. We have in milk the rarest and most valuable combination of food constituents ever prepared by nature, and one which cannot be prepared or equalled in a laboratory. And why should we not endeavour to produce and deliver such a valuable commodity to our weak infants and old people tottering to the grave in a condition at least free from dirt and disease. It is estimated that one quart of new whole milk is equal in nutritive value to one pound of beef. If we compare the relative prices of these two articles of food we will find that the purchasers of good whole milk receive about three times more nutritive material for a given sum of money than they do for a similar amount expended on beef. As already stated, milk is an economic food, and one of the cheapest food in most parts of the world that a careful

housewife can purchase. If it were possible to enlighten consumers as to the great value (in general) of milk by introducing a campaign all over the world, something along the lines of the quaker oats and patent medicine advertisements, it would undoubtedly greatly increase the profits of the average dairyman, which are—in my opinion—too small for the capital invested and for the energy and labour he puts into the business to produce his raw material.

The ideal system without any doubt, is delivery in glass bottles filled and sealed at the dairy, and placed straight on the table without the intervention of jugs, basins, or what not. The entire system at this dairy farm is so arranged as to supply a clean whole milk from healthy cows, kept under hygienic conditions and protected from dust and infection. This desirable object is attained by (a) clean milking; (b) straining; (c) cooling; (d) bottling promptly, efficiency, and at the dairy farm. On the whole, Mr. Sorenson's methods appear to represent the high tide of dairy farm work in England. But nothing is done by him which could not be done by every dairy farmer in the country. It will be understood that this system is an illustration of how to obtain a naturally pure milk supply without modification or sterilisation.

PASTEURISATION.

II.

Pasteurisation is simply the heating of milk to a proper temperature with a view to destroying the undesirable germs that may be present. It has been said that pasteurisation, if universally adopted, would lead to carelessness on the dairy farm. It does not, however, seem to me that the selling of milk from the farms produced under our present conditions is desirable, when we consider the extent of our knowledge of the healthiness of our herds and the methods of production and delivery of the milk to consumers. It is an incontrovertible fact that a fairly large percentage of our herds are affected with tuberculosis, and that at least a small percentage are affected with tuberculosis in the udder. We select tuberculosis for the reason that it is one of the most dreaded as well as the most dangerous of milk-borne diseases. There are, of course, other milk-borne diseases, such as diphtheria, scarlet fever, small-pox, measles, whooping cough, and others. In the face of these facts it appears that until such time as we absolutely free our herds from disease and bring about a revolution in our methods of production and delivery of milk some precautionary measures must be taken to protect the public from dirt and the transmission of disease through the medium of the milk supply, and the only known remedy lies in pasteurisation.

Definition of Pasteurisation.

We may define pasteurisation of milk as a process whereby the temperature is raised to a given point and kept there sufficiently long to destroy all undesirable micro-organisms, and at the same time not impair the flavour or alter the chemical constitution of the milk, and immediately there-

after cooled to such a low temperature as will prevent the multiplication of any bacteria which may subsequently gain access.

The secret of proper pasteurisation lies in the length of time the milk is exposed to the heat. The lower the temperature employed the longer must the milk be subjected to that temperature to ensure the destruction of the bacteria. In order to destroy different bacteria it is necessary to employ different degrees of heat. For example, lactic acid bacteria (the desirable germ in cream ripening) are readily killed by subjecting them to a temperature of 158deg. for one minute, whereas it requires 185deg. for the same length of time to destroy the germ of tuberculosis. If milk is heated and the temperature maintained at 175deg. for ten minutes, 160deg. for twenty minutes, and 140deg. for forty minutes, it has proved just as effectual in destroying this bacteria as heating to the higher temperature of 185deg. for the shorter period. The question may then suggest itself: If the higher temperatures are more effective than the low ones, why not go to boiling point and be done with it? The answer is simply because milk, when heated beyond a certain point, acquires a cooked taste, which is objectionable to consumers, and also if high temperatures are used, the albumen of the milk is caused to coagulate, and the constitution of the milk becomes physically altered, and no amount of subsequent cooling will remove the cooked taste or bring the constituents back to their normal or natural condition. It will be seen, therefore, that the treatment must vary according to the object in view. Let me say also at once that, in order to ensure proper and successful pasteurisation of milk for human consumption, the work requires to be in the hands of a very skilful person.

Thermal death limit of tubercle bacillus.

In selecting the proper limit of heat for pasteurisation in the city supply we must fix on a temperature and a system that will destroy all disease-producing bacteria in the milk, and of these organisms the tubercle bacillus, as already mentioned, is of most importance, because of its relatively high degree of resistance. Fortunately, this germ does not produce spores; therefore it can, by proper pasteurisation, be readily killed. The thermal death limit of these germs is, therefore, of special significance. In 1899 Dr. Theobald Smith performed a series of experiments on this question, which showed that, under certain conditions, the tubercle organism was readily killed by heating the milk to 140deg., and maintaining the temperature for 25 to 30 minutes. Other experiments in commercial pasteurisation which have been conducted recently by many eminent experimentalists have proved that the limit which had been used in pasteurising was an exposure of 155deg. for a period of about 20 minutes, this being the highest temperature which could be used without imparting a permanently cooked taste to the milk. With the use of this maximum temperature, a minimum period of exposure was secured, but, under these conditions, the consistency of the product and the creaming properties of the milk is greatly reduced, two serious objections from a practical point of view. Methods were devised which enabled the restoration of the consistency or "body" of heated cream, so that this objection was largely overcome. In order to study the practical effect of pasteurising at lower temperatures, experiments were conducted as to the completeness of creaming of the milk at 140 and 155 deg. At 155deg. the amount of cream observed on bottles of milk was always

less than that which collected on normal milk, and the cream line was also indefinite unless held for two days. The milk, heated to 140deg., for periods from 15 to 60 minutes, showed a rapidly-formed cream line, and as thick a layer as on the unheated milk.

As to keeping quality, in tests where the raw milk soured in about two days at 50deg. the pasteurised samples kept for at least six days, and there was practically no difference in the keeping quality of the two lots. These practical tests demonstrated that milk heated to a temperature of 140deg. possessed all the advantages that were secured by the use of a higher degree of heat, and at the same time the disadvantages of higher heating were overcome. A bacteriological study was also made of these milks. The destruction of germ life was first evident at 140deg., 98.9—99, 8 per cent. of all bacterial life being destroyed. An exposure to higher temperatures resulted in a slightly greater destruction of bacteria, but this slight increase in efficiency was not warrantable at the expense of the creaming properties or consistency, and the coagulating of the albumin.

In the light of these facts and from all my own practical experience of pasteurisation in dairy school work for city consumption and on a commercial basis in butter factory experience, I could recommend for our city trade treating all milk in a properly constructed Pasteuriser to a temperature of 140deg., and of maintaining the temperature at that point for 30 minutes, afterwards immediately and rapidly cooling the milk to 45deg. or below.

Delivery to consumers.

We are now concerned with (say) the handling of milk through a properly constructed pasteurising and clearance milk depot, capable of dealing with the whole of the supply of the city and suburbs. That being so, our first duty would be to secure that all the milk should be delivered to the consumer in a perfectly innocuous condition, and further, when the milk passes through our depot, we could guarantee it free from any suspicion of disease germs which were present in the milk at the farmyard, or which might have gained access in the course of transport and handling before it reached the depot.

Although the process which milk goes through in a pasteurising depot is simple enough to the ordinary layman, it needs to be, as already intimated, skilfully conducted, otherwise we are open to the much indulged in criticism of the sceptical, that "pasteurisation is a failure." Briefly, the milk is received into clean receiving vats, being first strained through a proper filter strainer. From these vats it is passed through what we call a pasteuriser, so named after the eminent old scientist, Pasteur. It is heated to 140deg., after which it is placed in insulated storage tanks and the temperature maintained for at least thirty minutes to ensure that every germ of a dangerous nature will be destroyed. It would not be possible to sell milk at this high temperature; therefore it is necessary to cool it by passing over a spiral coil cooler through which may be run ordinary well water, after which it may be passed over a second cooler through which chilled brine is circulated from a brine tank, the temperature being reduced to 45deg. or below. When milk is thus cooled and held at 45deg. or 40deg. it may be said to be almost germ-proof; that is to say, the milk is so cold that any ordinary bacteria would be inactive and unable to propagate. If the

milk is delivered to the householder at this low temperature it may be regarded as nearly perfect as it is possible to get it by artificial means.

In starting a milk depot in a city like this, whether the business be conducted by private enterprise, the Government, or by a co-operative company composed of the producers, it is clear that definite contracts with the dairy farmers will have to be entered into, so that their supplies of milk could be relied on and constant. Then again it always happens that there are times when the supply is in excess of the demand, consequently provision must be made by installing a small butter-making plant, so that any surplus milk may be converted into butter and separated milk.

Butter-making is a process that cannot possibly be conducted in a depot of this description at a profit, considering that it takes close on $2\frac{1}{2}$ gallons of milk to make a pound of butter. It is, however, better to utilise any surplus milk in this way than to permit it to be wasted. In dealing with milk and butter it is necessary that they should be properly preserved until required. This makes it compulsory to have a cool room or rooms and a freezing machine. Above all in modern dairy practice there should be means of thoroughly cleansing all utensils, and for this purpose a steam boiler and a separate room or department for that purpose are absolutely essential. The most important point for the success of a city milk depot such as I have only roughly outlined is in selecting a site, which should be as nearly central as possible and on a high level with means of effective drainage and sanitary surroundings, and there should be an abundant supply of pure water available.

There are many minor details which make for the success of a milk depot of this kind, but the scope of this paper will not permit of my dealing with them.

THE WORLD'S CHAMPION DAIRY COWS.

As a subject of interest to those who are anxious to promote the development of the dairy industry in this State, we reproduce in this issue illustrations of four noted dairy cows which *Hoard's Dairyman* claims to be the champions of the world in their respective classes.

No. 1. Jacoba Irene, champion Jersey cow of the world, has the following record:—Last year (1907): milk, 14,254lbs.; average test, 5.6 per cent.; fat, 798.48lbs. For 10 months 1908: milk, 15,503.7lbs.; average test, 5.5 per cent.; fat, 853.9lbs. Owned by A. O. Auten, Illinois, U.S.A.

No. 2. Rena Ross, champion Ayrshire cow of the world. Record for one year: milk, 15,072lbs.; average test, 4.26 per cent.; fat, 643.2lbs. Owned by J. R. Valentine, Penn., U.S.A.

No. 3. Yeksa Sunbeam, champion Guernsey cow of the world. Record for one year: milk, 14,920.8lbs.; average test, 5.74 per cent.; fat, 857.15lbs. Owned by the Reitbrock Estate, Wis., U.S.A.

No. 4. Colantha Fourth's Johanna, champion Holstein cow of the world. Record for one year: milk, 27,432.5lbs.; average test, 3.64 per cent.; fat, 998.26lbs. Owned by W. J. Gillett, Wis., U.S.A.



Hoard's Dairymen.

Jacoba Irene, Champion Jersey Cow of the World.

MAINTENANCE OF FERTILITY.

(By Professor W. Lowrie, M.A., Director of Agriculture.)

The following article, which was published in a recent number of *The Farmers' Union Advocate* (N.Z.), is by Professor Lowrie, late of Lincoln College, Canterbury, now Director of Agriculture in this State. Although the subject is treated from the New Zealand point of view and in regard to the general conditions of agriculture in the Dominion, the paper is also of value to farmers in Western Australia, many of whom are situated under somewhat similar circumstances and will find the Director's paper applicable as well as interesting.

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This is a question of great importance to the farmer and to the State, for in proportion as fertility is understood and maintained judiciously, the returns from the land will be increased. In the Dominion speaking generally, the matter is only now beginning to receive that careful consideration which it deserves, but the explanation is patent. The land was acquired originally with the accumulated fertility of ages latent in it, and the pioneer farmer in exploiting it was led naturally to think of his land much as a miner thinks of his reef—something from which wealth has to be drawn in the quickest way practicable. Indeed, on much of the good land in Canterbury, a process of exhaustion was justified, for the land was too fat to carry such pioneer crops as wheat to best advantage. The excessive growth of straw induced by the extreme fertility was not always followed by a corresponding yield in grain. In wet seasons the grain was damaged through the crop lodging and often a spring favourable to rank growth resulted in such luxuriance that when a period of hot, dry weather supervened when the crop was in ear, there resulted a pinched or shrivelled sample. An end to this state of things was easily reached, but fortunately, long before the land had been reduced by frequent cropping to that extreme degree of impoverishment witnessed, for example, in some parts of Australia and America, the practice of mixed farming extended, and more attention was devoted to live stock. The land in rotation was sown out with grass and clovers and consequently rested, or even recuperated. Then the development of the freezing industry brought a rousing influence of importance the most far-reaching towards improvement in farm practice. The value of forage and root crops as a means of increasing the carrying and fattening capacity of the farm became evident, and, as such crops demand readily available manures, the extension of their cultivation became a means of replenishing the soil. But the end is not yet: It is well so far, and that only. The application of artificial manures usually made—one cwt. per acre or thereabout—to root and forage crops only, in this district at least, may be sufficient to maintain equilibrium in the soil at that position below full fertility which now obtains, but will not suffice to bring it back to the condition of fertility consonant with maximum profit. Some years of fairly generous manuring to cereals as well as root and forage crops, will be required to bring about that result, but when it is brought about it will be practicable to lower

the manure bill to the limit sufficient to maintain equilibrium near full fertility and continue to realise on crop and pasture alike, something near the limit of profit. If the subject of the maintenance of fertility were better understood, and if it were fully realised how far below the limit of its capacity much of the land is being maintained, there would not be seen so many farms being laboriously worked, year in and year out, and all the while not in condition or heart to respond to that work as far as the climate and physical characteristics of the soil allow. Undoubtedly one of the ways of meeting the high price of labour is to provide that the result of that labour shall not be limited by the semi-exhausted condition of that land on which it is expended. It will not be questioned as things are now, that much of the land would better repay the labour spent on it were it put into better heart. Let it not be understood that liberal manuring would diminish the amount of working of the land now considered indispensable; on the contrary, such manuring without good and sufficient working is wasteful, for the full value of the manure is only secured on land so thoroughly worked that the crops can properly utilise it. Indeed, the fundamental importance of working the land well is not to be argued: it is not likely to be questioned even, if it be recognised that the surface soil is the matrix of the activities of inconceivable numbers of ferments, bacteria or microscopic fungi (estimates of their number have been given as some millions per cubic inch of soil), and that some of these lowly forms of life exercise a most useful influence in the soil, and are essential to changes in its composition indispensable for the nutrition of plants. As it happens, just that condition which practice describes as mellow tilth, is best adapted to stimulate the multiplication and general activity of these unseen myriad agents, which conform to the same general laws of life, nutrition, and death, as organisms higher in the scale of life, for in a good tilth moisture is conserved, and a circulation of air essential to life is facilitated. Further, it is indispensable that some of the most valuable constituents of artificial manures be acted on or changed through the work of ferments before becoming nutritive to plants. It will be allowed that such working of the land as will increase the ferment activity will enhance the value to be derived from the manure. In a soil well worked, the delicate rootlets of the plants spread more freely and widely; the solvent action of the root-sap and moisture is increased, for the smaller the particles of soil the greater the surface exposed; the movements of water, and consequently the movements of air are more freely allowed, and the beneficial action of the swarming microscopic organisms is increased. On the other hand, when the soil has been puddled through being worked too wet, or when it is water-logged through lack of drainage, or when tilth is wanting, the healthy functioning of the roots is prevented, and bacterial activity is lessened. Manuring, therefore, is not to be reckoned in any way a substitute for thorough working of the land, but rather as a means of realising the full value of such working.

In the matter of manuring, also, it is well that our practice should be governed by the facts which modern research has elucidated in relation to the nitrification of organic matter, to the accumulation of nitrogen through bacteria in symbiosis with leguminous plants, and to the direct fixation of the free nitrogen of the air by the soil itself through the agency of bacteria, as nitrogen is much the most expensive element in manures, and it may be profitable to secure a sufficiency of that ingredient by extending the area of leguminous crops and at the same time working the soil so as to make the most of



Hoard's Dairymen.

Rena Ross, Champion Ayrshire Cow of the World.

the activity of the nitrifying ferments in bringing the organic matter of the soil—roots, leaves, dung, etc.—into available form. The explanation of the benefit accruing to the soil from the growth of such leguminous crops as peas, vetches, and clovers is found, as is now well-known, in the nitrogen restoring influence of bacteria associating with legumes, and living in the nodules produced on their roots, but although the explanation was wanting until this generation the practical fact of experience, that great advantage to the soil invariably followed the growth of legumes, has been common knowledge for ages. Virgil has it thus:—

“At least where vetches, pulse, and tares have stood,
And stalks of lupines grew a stubborn mood,
Th’ ensuing season in return may bear
The bearded product of the golden year.”

The cultivation of clover needs no pleading: its value as a crop or as a constituent of our pastures is allowed unhesitatingly. But it is not so generally known that clovers can be greatly encouraged by the application of phosphates and lime, and in many cases by potash, and that a double benefit to the soil results from such applications. There is, firstly, an increased yield of forage; and secondly, an increased accumulation of nitrogen through the greater vigour of the manured plant. It may be confidently affirmed that, when grasses and clovers are sown out with cereals such as barley or oats, it is profitable to apply with the cereals a dressing of superphosphate or basic slag. The increased yield of grain, especially barley, will pay handsomely for the manure; the carrying capacity and fattening value of the pasture will be found to be very appreciably increased, in relation to milking cattle the higher percentage of clover with the consequent increase of albuminoids in the forage will stimulate the milk yield, and the land will be improved in fertility directly from the residue of the manure applied, and indirectly by the increased accumulation of nitrogen.

But something more can be done in the way of renovation of nitrogen over and above the growth of clover. Peas and vetches, for example, are now much neglected crops, but if their value in rural economy was more justly estimated, I believe the area under each of these crops would be extended. Peas on well farmed land return nearly as much per acre as wheat; the crop is not much more risky; the expense of harvesting is less now than it was a few years ago before the simple pea-harvester attachment to mowers was introduced; the grain provides a very valuable constituent of farm rations, especially for growing stock, and the gain in nitrogen to the land which has carried peas is equivalent to an application of at least four or five cwt. of nitrate of soda. To get full returns from peas, however, it is necessary to apply to the land five cwt. or thereabout of ground quick-lime broadcast, and say, 200lbs. per acre of superphosphate, or its equivalent of basic slag, drilled with the seed. Again vetches will smother weeds, and help to clean land from annuals; it is one of the best forage crops known, being hardy, bulky and nutritious; it makes, when mixed with oats or barley, a valuable soiling crop to be cut for feeding in the spring; when cut at the right time, and saved in good condition it furnishes first-rate hay; when mixed with some cereal it affords excellent early spring feed to be grazed by ewes, and it may be sown in the early spring with rape when it will offer, for early lambs at weaning time, a fattening forage mixture unsurpassed. Let there be added to these merits its value in adding fertility to the land, and the case for the vetch is

surely proven. There are few ways of recovering and improving the fertility of the soil more prompt, effective, and economical than growing vetches with a dressing of two cwt. per acre, or more, of superphosphate or basic slag, according to the land, and feeding the crop on the land, and as has been indicated for peas the result on the soil will be greater if a few cwt. of ground quick-lime have been broadcasted as a preliminary. A heavy crop of vetches straight, however, hugs the ground too closely, and for grazing it is better mixed with cereals such as oats, Cape barley, or giant rye corn. Such mixture will yield enormous quantities of feed, when generously treated with manure. It can be grazed well on to Christmas and followed with early sown Italian rye grass and clovers or lifted early enough to be followed with rape and mustard for autumn feed, if the season is fairly moist. Another very excellent practice is to sow rape and vetches in the spring sufficiently early to give the vetches a good chance. Drill the vetches with say, 120lbs. of superphosphates, and cross drill with rape, and say, one cwt. of freezing works' special kale manure, sowing the rape quite shallow. The velvet vetch (*vicia villosa*) is to be recommended in preference to other varieties for sowing with rapé. It grows much finer in the straw and stands grazing better, while yielding a good bulk of very palatable and nutritious forage. We have been growing this vetch for two years on the College farm and it promises to meet the bill well. Altogether, I would urge a more extended use for the vetch and the growing of a few acres for seed on every farm. The re-seeding of the land is only a slight consideration now where sheep are so prominent on every farm, that the land carrying vetches for seed can always be followed by a forage crop or Italian rye grass to be grazed, and the seed shelled out can be got rid of accordingly. It is well within the mark to say that the gain to the land from vetches fed down in this way is worth 30s. to £3 per acre. In evidence that this estimate is on the safe side I will quote Moore, of the U.S. Department of Agriculture. "In Germany," he writes, "the number of pounds per acre of nitrogen added to the soil by legumes is estimated at 200 pounds. In the United States the average from sixteen States is 122 pounds." Now in the Dominion that amount of nitrogen cannot be bought in nitrogenous manures, such as nitrate of soda, sulphate of ammonia, or dried blood, for less than £4 to £6. Surely, therefore, there is good reason for urging this practice as a means of replenishing our soils, and I am confident that within a few years it will be generally adopted. Indeed, I have good reason for the belief that the more closely we get into line with nature and our natural conditions, in farm practice, the more economically and more successfully can the farm be worked. Ferment activity is more pronounced in the Dominion than British experience would lead us to anticipate, and it is for farmers to avail themselves most of this greatly benefitting, valuable, unseen, natural agency. Let them feed the land with superphosphates and occasional dressings of ground quick-lime, and grow legumes sufficiently wide and little need will arise to look round for nitrates—the most expensive of manures—on good farming land. On light land it may be advisable to use nitrogenous manures as well as phosphates, and potash salts may also prove remunerative there. But the question is easily settled in these days of drill husbandry and readily available manures. It needs no experimental farm for the investigation of a question of practical husbandry such as this. Surely every farmer can try blocks of four or five acres in his different fields with



Hoard's Dairymen.

Yeksa Sunbeam, Champion Guernsey Cow of the World.

different mixtures and different quantities, and the results will be available to him as he walks along the headlands. The information which chemical analysis of his soil might give him would be meagre and uncertain compared with such practical everyday workable tests. Indeed, it may be whispered that a farmer who has a good working knowledge of the composition, function, and utility of different manures, and a good practical knowledge of the working of land, can work out his own guide lines most surely in this way, as he knows thoroughly his land and its previous cropping history—an important matter in relation to reports of experiments.

So far as this farm goes it is indicated that phosphate manures are most profitable. They feed the plant, and encourage the nitrogen fixing bacteria and their influence on the crops is not so much affected by spells of dry weather.

I will close this article by setting out in the broadest and most general way the practice of manuring which experience seems to justify:—

Wheat: $1\frac{1}{2}$ to 2 cwt. per acre of superphosphate or basic slag. When growing wheat after wheat superphosphate and dried blood 2 to 1, or superphosphate and special kale manure, half and half.

Barley: About 200lbs. of superphosphate.

Peas and vetches: $1\frac{1}{2}$ to 2 cwt. of superphosphates mixed with wood ashes as far as this last is obtainable, and 5 cwt. of ground quick-lime applied before sowing.

Turnips: $1\frac{1}{2}$ to 2 cwt. of superphosphates mixed with a little wood ashes; or 1 cwt. of superphosphates and $\frac{1}{2}$ to 1 cwt. of basic slag blended immediately before sowing; or, on very open thin soils, $\frac{1}{2}$ cwt. dried blood and $1\frac{1}{2}$ cwt. of superphosphate.

Rape: 2 cwt. of special kale manure—a blend of superphosphate, bone dust, and dried blood—made up by the Canterbury Frozen Meat Company.

Mangolds: 3 to 4 cwt. per acre of a mixture of the following, in these proportions:—Dried blood 8 parts, superphosphate 3 parts; bone dust, 4; kainit, 4; and sulphate of potash, 1 part; or, in the case of mangolds after lea, kale manure and kainit, 3 to 1, or thereabout.

Such manuring will, in a very few years, bring a farm up to the very fullest fertility; when the amount applied can be gradually reduced to half the quantity or thereabout. Of course, many considerations must modify the applications, but chiefly the character of the cropping and the proportion of grass on the farm. Permanent pastures will respond profitably to a top-dressing of basic slag. The manure bill on a farm of 800 acres under the indicated practice will range from £150 to nearly £200 per annum; but the increased returns due to this outlay will amount to more than double these figures, and the farm will be from year to year gaining in fertility.

NATIONAL SHOW, BUSSELTON.

The progress of agriculture in the southern division of the State was strikingly demonstrated at the National Show of the Southern Districts Agricultural Society, which was opened at Busselton on Wednesday, January 20, by His Excellency the Governor, Sir Frederick Bedford, who was accompanied by the Minister for Agriculture, Hon. Jas. Mitchell, and the Colonial Treasurer, Hon. F. Wilson. There was a most gratifying attendance of people from many parts of the State, the visitors including Sir John Forrest, M.H.R., Messrs. T. H. Bath, M.L.A., H. Carson, M.L.A., E. M. Clarke, M.L.C., A. A. Horan, M.L.A., J. B. Holman, M.L.A., W. D. Johnson, M.L.A., E. McLarty, M.L.C., C. H. Layman, M.L.A., C. McDowall, M.L.A., T. H. Wilding, M.L.C., Professor W. Lowrie (Director of Agriculture), W. Paterson (Manager Agricultural Bank), A. Despeissis (Under Secretary, Department of Agriculture), Theo. R. Lowe (Secretary Royal Agricultural Society), E. S. Weir (Chief Inspector of Stock), and J. A. Kinsella (Dairy Expert).

During the past year the Society has effected very considerable improvements to the show grounds, affording much additional accommodation to exhibitors and comfort to the general public. Exhibits were received from a majority of important farming centres, and these exceeded in number and expectation those of all previous shows. Added to this, splendid weather prevailed throughout, leaving nothing to mar the enjoyment and admiration of the visitors. Great credit is due to the President (Mr. R. Gale), Secretary (Mr. F. H. Layton), and members of the Committee for the efficient way in which the entire arrangements were conducted.

Busselton possesses a great advantage in its excellent port and shipping facilities, enhancing the progress and prosperity of the country of which it is the outlet. There are great resources for continual development in agriculture fruit-growing, and dairying, besides a valuable timber industry. Possibilities in these directions were clearly seen in the splendid and various display in the several departments.

HORSES.

In the horses' class there were some fine representations. Thoroughbreds were not strongly represented. Mr. M. Locke's stallion Inverton gained first prize and champion from Matchlock, a son of old Lockville, owned by Mr. H. S. Brockman. Amongst the mares, Mr. Wilding's fine animal Lily's Secret stood far in advance of the others, and gained first and champion; Cinderella, bred by Mr. C. F. Roberts, being next in point of merit. Mr. E. McDaniel's two-year-old colt, and a yearling owned by Mr. C. F. Roberts, were unopposed in their respective classes. Several good brood mares were shown in the West Australian bred classes, first prize falling to Mr. H. S. Brockman's Mermaid; Mr. Percy Reynolds' The Lark securing second honors. In the two-year-old fillies Mr. M. Thomson's Myown gained a verdict over one of Lockville's get from The Lark. The aristocratically bred Lily Barbara, Barbarossa—Lily's Secret, easily disposed of her opponents in the class for youngsters. In the Draught Stallion Class there were four competitors. Mr. T. H.



Hoar's Dairymen.

Colantha Fourth's Jolanna, Champion Holstein Dairy Cow of the World.



Wilding's Royal Blue secured first and champion over King of Quality, owned by Mr. M. Thomson; Glen Luss Benedict and Prince Albert being the two others shown. Six mares were paraded in their class, and both prizes went to visiting horses. Mr. Wilding added another eight points to his list for the Governor's Cup by securing first prize and champion with his handsome Deborah. Wills & Co's. Hawkhurst Queen was second. In the class for farm mares, Higgins Bros.' locally bred pair, Nelly and Lady, secured a well-deserved victory, a pair bred and owned by Mr. G. P. Paterson gaining second. The two-horse team was also secured by Higgins Bros., with Briton and Prince. There was no entry for Suffolk Punch stallion. Of the Clydesdales, Mr. Chas. Reynolds' three-year-old Lochiel, by the famous Lord Dundonald, was successful in defeating Thomson's King of Quality. The winner was a beautiful stamp of animal in splendid condition. The prize for Clydesdale mare went to Mr. J. L. Rose's "Rose." Three horses faced Mr. Leeder for W.A. bred stallions, Royal Albert securing first, and Mr. Thos. Moriarty's Gladstone second. The class for mare was a good one, and Mr. A. W. Pries beat Mr. Wilding for first honors with Blossom, a fine mare indeed. For a special prize given for colt by Glen Luss Benedict, 1908 foaling, Della, owned by G. W. Payne, was adjudged the winner.

There was a batch of well-known performers in the trotting stallion class, which included Van Osterley, Odd Trick, Osterley's Pride, Black Grainger, Henry Clay and Agent. The two first-named secured first and second honors respectively. Mr. H. S. Brockman's Mentores secured the award for trotting mare, defeating the Royal Show winner, Belmont Opal. Mentores also secured first prize for best all round horse, Belmont King getting second prize. Of the fourteen entrants in the 14.1 ponies, ten entered the ring; Mr. Hall's Nancy, a daughter of Osterley's Pride, being placed first.

CATTLE.

Taken as a whole the display of cattle was very good, although it must be admitted that some of the classes might have been better filled. Almost without exception the animals were in splendid condition, and this fact was noted by the judge, Mr. Weir. In the dairy breeds Ayrshires were particularly strong, while there were also some excellent Jerseys penned. Fat cattle were fairly represented. Mr. H. H. Robert's Shorthorn bull took first prize and champion, Mr. C. F. Roberts coming second.

SHEEP.

The display of sheep was far in advance of any yet seen in Busselton, and it is only paying a just tribute to the quality of the stock to state that they were constantly securing attention. Splendid specimens of Merinos, Romney Marsh, Dorset and Leicesters were in the pens. The fact that farmers are realising that there is money in sheep, and that the country is largely adapted to the production of fat lambs, may account for the interest taken in this class.

PIGS.

Following the general rule of Agricultural Shows in this State swine were not in great numbers, although those shown were of fair average quality. It is generally agreed that the pig is a natural adjunct to the dairy farm, and that being so, until the dairying industry gets firmly established there does not

appear to be a prospect of increased numbers at shows. Berkshires were the only class, and Mr. R. Gale's boar took first and champion, and Messrs. Macfarlane & Co. similar position for a sow.

POULTRY.

Poultry classes were fairly well filled, and taken as a whole were a good even display. In several breeds there were some good-looking birds, worthy of consideration at any show.

PRODUCE.

The exhibition of farm produce, vegetables, fruit, etc., was a magnificent one. All varieties were in great quantities and quality. Potatoes stood out especially strong, and covered the whole of one side of a building. The quality throughout the large quantity shown was beautifully even, and the task of the judge was anything but an easy one. Onions were also excellent and proved beyond doubt the fertility of the district for this crop. Other vegetables were good, while the collections shown as produce of one grower were creditable indeed to the producers.

The new butter hall proved decidedly advantageous, and the exhibits were kept wonderfully firm and clean. The Brunswick State Farm was represented by exhibits manufactured by the State dairy expert, for exhibition purposes only. Excellent exhibits of farm products from the Hamel and Brunswick farms were much admired.

FIELD EXHIBITS.

Fodder grasses, including pasture plots, were good, those annexing the prizes for lucerne and *paspalum dilatatum* being excellent samples. Grain was fair, while maize and sorghum were quite up to the average.

THE SUNFLOWER.

(*Helianthus psycanthus*.)

The sunflower makes a good catch crop and is easy to grow in the southern districts and also in moist parts of the central district, very fine specimens often being shown by growers. The soil should be prepared in the same way as for corn and the seed planted two or three inches apart in rows of three or three and a-half feet distant. When the young plants are a few inches high they should be thinned out, leaving spaces between of eighteen inches. Excess blooms should be cut off, allowing only two or three heads to develop. The heads are gathered before they are completely ripe in order to guard against them shedding the seeds. After the heads are dried, they can be threshed with a flail.

The yield varies from 700lbs. to 1,000lbs. of seed to the acre, or from 23 to 30 bushels, and will return about 20 per cent. of oil by cold-pressure extraction, for which there is a good market. Stock will feed on the leaves either in the green state or as ensilage.

SOIL BACTERIA.

(M. d'A. Burney.)

In this age of progress and enlightenment developments are continually being made in the knowledge of the life history and mode of existence of all living things around us. In the last fifty years, or so, enormous advances have been made in our knowledge of microbe life in all its phases. The study of bacteria has enabled medical science to successfully ward off small-pox, plague, diphtheria, and other dread diseases. We are told how, by patient study of the life habits of the bacteria causing these diseases, their antidote has been discovered and secured. Further discoveries are being made every day which may lead to the equally successful combating of other diseases. If this has been quite easy of comprehension in the animal kingdom, in the vegetable kingdom plant life and its functions have been regarded as dependent upon the physical and chemical conditions of the soil only. The deficiency of growth, due to the want of plant food, has been remedied by the addition of potassic or phosphatic measures of which the supply is both cheap and plentiful. Nitrogen, however, is another necessary element of plant food of which the supply is very distinctly limited in a combined form. Nitrate and guano beds are nearing exhaustion.

At present the manufacture of so-called lime-nitrogen by electricity is too costly to be of commercial value. Instead of being faced, however, with a nitrogen famine, scientific investigation has put within our grasp a cheap and quite inexhaustible supply of nitrogen. Bacteria came to the rescue in association with leguminous plants which are able to take the free nitrogen from the air and put it into the soil in a combined form. The nodules, lumps or tubercles found upon the roots of all leguminous plants (beans, peas, lucerne, rape, lupin, etc.) are the nitrogen factories where these bacteria absorb the free nitrogen and turn it into compounds suitable for plant food.

The beneficial effect upon the land of leguminous crops has been recognised since the days of Pliny. It was not until 1886 that Hillriegel demonstrated that these plants obtain their nitrogen from the air, and in collaboration with Willfasth, that they can be grown in soils totally wanting in nitrogen, and also that the vigour of the plants is dependent upon the formation of tubercles upon the roots. In the following two years, further developments were proved by Marshal Ward, Breal, Schloesing, Laurent, and others. In 1888 Beyerinck obtained a pure culture from the root tubercle on an artificial media and named it *Bacillus radicola*. In 1890, Razmowski, succeeded in obtaining a wonderful growth of beans by inoculating their roots and from that period the extreme importance of the inoculation of leguminous plants with nitrogen-forming bacteria began to be appreciated. A culture was soon upon the market in the form of "Nitragin," but was a failure owing to the difficulty of keeping the culture in an active state not being overcome, and also through it being grown in a wrong medium. The American Department of Agriculture here set to work to investigate the question, and after two years' experiment inoculating material was dis-

tributed on a large scale. During 1903 and 1904 over 12,000 packages were sent out to farmers and the reports showed 74 per cent. of the trials to be successful. In 1905, this temporarily attracted the attention of the English Board of Agriculture who the following year distributed a few samples of inoculating material obtained from America and Germany, but which, through being stale, gave a very large percentage of negative results. After publishing their report, mostly upon dead bacteria, the Board after this magnificent effort considered its mission accomplished and it has been left to Professor W. B. Bottomley of King's College, London, to come to the rescue. He has published the result of his careful and eminently successful experiments in a pamphlet from which I cannot do better than quote extracts.

"During the winter of 1905 research work on some unsolved problems in the life history of the nitrogen fixing organism, had been in progress at the Botanical Laboratory, King's College, London, and the experiments of the Board of Agriculture had been followed with keen interest. In the spring of 1906, when it was found that the Board did not intend to follow the subject further, much disappointment was felt, and, eventually, after considerable hesitancy, it was decided to distribute such of the prune cultures from the King's College experiments as were suitable and available for inoculation, and thus continue within the narrow limits of time and means of disposal, the work which ought to have been carried out by the Board of Agriculture.

"In the autumn of 1905 a bulletin had been published by the New York State Experiment Station showing the inability of the nitrogen fixing organism to retain its vitality for any considerable time when dried on cotton wool—from six weeks to two months being the limit in most cases. Failure followed each attempt to develop cultures of the organism from the commercial cotton cultures. These failures could not be ascribed to the laboratory methods employed, since the method was uniformly successful when laboratory cultures of the organism were used in the place of cotton cultures. The failure of these cultures was due to the inability of the nitrogen fixing organism, under ordinary atmospheric condition, to maintain itself upon the cotton for any considerable time. While our results explain the many failures from the use of cotton cultures, they should not be understood as being opposed to the idea of treating the seed of legumes with living bacteria. Little wonder that the Board of Agriculture obtained so many negative results when in their report we find it stated that in some cases the cultures were received from Washington in the autumn of 1904 but were not used until the following spring.

"In this connection it is interesting to note that the American Government has given up the use of cotton-wool as a medium for distribution, and now sends out pure culture in liquid form in bottles. When it was decided to send out inoculating material from the Botanical Laboratory at King's College, it was necessary, in view of the New York experiments, to find some other medium than cotton-wool for the distribution of purer cultures. After a number of experiments it was found possible to obtain a powder preparation of the bacteria, in which condition they retain their vitality for months. Some are still active after being kept for two years.

"During 1906 and 1907 over a thousand packages of this preparation have been distributed free to anyone who cared to test the inoculation of

seed or soil, with the gratifying result that over 80 per cent. of the reports returned show an increase of crop from its use.

“At this point it will be well to utter a warning against any misconception or unjustifiable expectations regarding the use of bacterial cultures. Inoculation is not a panacea for all soil ills. The cultures are not a manure, they simply add to the soil the nitrogen-fixing bacteria which are essential for the most successful growing of leguminous crops, and this only when certain soil conditions are favourable.

“It should be clearly understood that the nodule forming bacteria supply nitrogen only to the crops and soil. If the land is deficient in phosphates, potash, or lime these must be added if the bacteria are to do their work properly. Plants require phosphates, potash and lime as well as nitrogen for healthy and vigorous growth, but nitrogen is the most important as well as the most expensive food element, and given the presence of other food elements in the soil, inoculation will supply all the nitrogen necessary for the luxuriant growth of a leguminous crop even in such an unlikely medium as sterilised sand. A fine crop of Mexican beans has been grown in volcanic ash from Guatemala in King's College Laboratory by simply adding culture solution to the ash.

“It cannot be too strongly emphasised that the cultures of nitrogen fixing bacteria are not to be regarded in the light of nitrogenous fertilisers, increasing the yield under any and all conditions. The cultures do not contain nitrogen. They simply add to the soil the bacteria which, under favourable conditions form nodules on leguminous plants, and render available thousands of acres of non-productive land it does not pay at present to till and manure, which can be restored to fertility and productiveness by the use of these bacteria cultures.

Given suitable conditions the advantages which may be expected from inoculation are:—

1. Increased yield of leguminous crop.
2. Improvement of land for succeeding crops by adding organic nitrogen to the soil.
3. Increase of nitrogenous contents of inoculated plants, which means increase of feeding value.
4. In many cases hastened maturing of plants, thus allowing of earlier marketing of produce with enhanced value.”

Much space is devoted in the remainder of the pamphlet to enumerating the results obtained up to date. These are most striking and prove conclusively that by the use of nitrogen forming bacteria with leguminous crops large quantities of organic nitrogen can be added to the soil at little more than nominal cost. *Bacillus radicola* is, according to H. Cerelet in the *Revue de Viticulture*, a unicellular micro-organism in the form of forked or V-shaped sticks and is aerobic, i.e., it lives in the presence of atmospheric oxygen. Cultures are prepared for distribution in the form of a powder which is cultivated in water much as one would prepare a wine levure and with no more difficulty. The seed is damped with the culture in solution and dried in a cool place and used as required.

The value of such a means of obtaining free nitrogen is quite fabulous. It has been estimated that calculating on the basis of 6d. per lb. of nitrogen there is no less than two million pounds worth of free nitrogen in the air above every acre of land.

The want of nitrogenous manures in Australian vineyards can be seen by comparing their yield with that of similarly situated European vineyards. It is the practice almost everywhere in Europe to save every particle of farmyard manure and put it on the land every autumn. Such a supply is not available in Australia and in any case excessive dressings of farmyard manure have a tendency to make the land dirty, and what is far more important, do not tend to improve the quality of the wine resulting. Soils are largely wanting in humus and organic nitrogenous manures, and by the use of green manures, cow-pea, lupin, and the like the want can be remedied at a very small cost. By this means a large supply of organic nitrogenous plant food, which becomes gradually available to the vine roots, can be obtained, and while improving the moisture bearing capacity of the soil it in no way can affect the quality of the wine resulting. No sudden and immediate result is to be expected but a steady and gradual improvement to the land which will last for years. Frequently green manures have appeared a failure in some of the hotter districts of Victoria, where they were most wanted. It is probable that this was caused by the want of nitrogen-forming bacteria preventing the plant making the most of its opportunities. If this is at present only a surmise it opens a wide field for useful and valuable experiments which may not only render fertile and remunerative the very poorest soils, but may very largely increase the yield and improve the feed value of many leguminous fodder crops.

This question has quite passed the purely experimental stage in Europe and America, and the object of this short article is to draw attention to a simple and inexpensive means of obtaining nitrogen as a plant food and of the advisability of distributing among farmers cultures of nitrogen-producing bacteria. At present it is certain that the *Bacillus radicicola* can only live with legumes, but that does not prove that there are not other nitrogen-forming bacilli which live with other crops. It is a subject upon which the future of Australian agriculture may receive the greatest aid and assistance. The present system of letting land lie idle for one whole year in fallow may be quite expedient under present conditions of large holdings, but as the land becomes subdivided into smaller holdings such a system will be economically impossible. As land increases in value so will the returns have to increase. As much is taken from the land in the form of wool, wheat, wine, or fodder crops so will much have to be put back when no more virgin land will be available. The science of agriculture is receiving the best of attention in the ably manned State departments, and it is upon questions such as these that they can carry out the initial investigations and bring to the farmer the practical method whereby he can increase his returns and husband the resources of his land so that it may support his children and his grandchildren after him.



Mr. W. H. Lang's Lucerne Field, Capel River. (Not irrigated.)

SUMMER FODDER COMPETITION.

The following report was presented by Mr. A. Despeissis, who adjudicated the awards in connection with the competitions under the auspices of the Southern Districts Agricultural and Pastoral Society:—

“The awards in connection with the competitions for the prizes for the best fields of artificial grasses and fodder crops, offered by your society on the occasion of the National Show, was duly submitted on the date of your show at Busselton.

The mere enumeration, however, of the names of winners cannot carry the same interest for those who have not been privileged to inspect the plots entered for competition as it would if accompanied by comments and remarks resulting from a personal visit.

I therefore take the opportunity of submitting, for the information of your society, and those sufficiently interested in the question of artificial pastures and fodder crops, a resumé of my observations while adjudicating the prizes offered by your society.

Altogether a sum of £62 10s. was offered by your society for prizes, ranging from £2 10s. to £10, in nine classes, comprising artificial grasses of a minimum area of 1, 3, and 5 acres; peas, rape, kale, mangold, maize, at least one acre each.

Altogether forty entries were registered. Six of these were either withdrawn or did not fully comply with the conditions.

The entries extended from the Capel to Quindalup, over a length of 30 miles.

I heard the opinion expressed during the show that the comparatively large sum offered by your society as prize money could have been expended in a more useful and more tangible manner as prize money in classes represented on the show ground itself. This opinion can only be the result of shallow observation.

Throughout the South-West districts, more especially where heavy timber covers the ground, our pastures are non-existent, they must be made. Until this is done, the stock-carrying capabilities of the land are only retarded. Then will our shows more truly reflect the agronomic possibilities of the land.

To the stock-breeder and to the cultivator these field competitions are so important that agricultural societies cannot overlook them. A generous recognition of this fact on the schedule of prizes will lead to the filling of the pens with a better class of stock, and the loading of the benches with produce of greater value and greater variety.

GRASSES.

In the following notes I will refer to the crops which have come under notice in a general way, in order to avoid repetitions, and simply draw deductions suggested after inspections.

In a country such as this, where indigenous grasses, with few exceptions, brown off about midsummer, and remain dry and useless as fodder for some months, it is important to turn attention to the introduction of new grasses, suited to our climatic conditions.

Hitherto the finer and more highly prized English grasses have been sown, but in many instances they have been found unsuitable to this country, while on the other hand, harder varieties have given better results.

Cocksfoot is probably the more generally sown artificial grass. In the pastures visited it showed best on damp loam, where drouthy conditions are not experienced to the same extent as on the loose sandy loam. The best cocksfoot was met with on the cleared land once under a heavy redgum and jarrah forest. The grass germinates readily, but grows tussocky, and does not seem to re-sow itself, and thus fill the gaps caused by the disappearance of old plants. Yorkshire Fog is often introduced with it, more especially when New Zealand seeds are purchased without a guarantee of purity. This guarantee is only given by leading seedsmen, and the slightly higher rate asked is generally a sound investment.

In respect to Yorkshire Fog, Australian conditions seem to improve the feeding qualities of the grass. An analysis made of a sample collected at Mount Barker a couple of years ago, shows a strikingly better value than do analyses of English-grown Yorkshire Fog.

That grass, besides, possesses valuable self-seeding qualities, and quickly spreads along water courses and damp places, whilst at the same time it is one of the few grasses which remain green throughout the summer, even on apparently dry soil.

For want of something more palatable, stock eat it readily in the summer time; it keeps the blood in good order, although it may not have great fattening qualities.

Whatever the merits, or otherwise, of Yorkshire Fog may be, the fact remains that it is often unintentionally introduced with the more carelessly gathered cocksfoot seed. To prevent the possibility of this grass smothering others, it could be sown by itself in special paddocks.

Rye grass, both the annual Italian and the perennial variety were also seen. These grasses, under the conditions prevailing during our dry summer, brown off in December unless they are irrigated. They yield, however, an abundance of winter and spring feed, and suit best cool, wet land. Stock are very fond of it and, where they had access, these grasses had been eaten down to the crown. The Italian annual is a stronger grower than the perennial, when not allowed to run to seed, they will grow for two years or more. As fodder they are superior to cockspur, seed freely, and do well in a mixture of grasses.

Prairie grass was met with at two places, where it was doing very well on cleared redgum forest land. Like rye grass, it comes away early in the winter, but stands the dry weather better. Stock being very fond of it they soon kill it, and on that account it should be sown in small paddocks which can be rested at frequent intervals. It will prove a valuable perennial grass in the cooler districts.

Paspalum dilatatum is now well known throughout the country. In the Southern districts it thrives remarkably well. In drier localities it has not given the same good results as in the portions of New South Wales and Victoria visited by summer rain. Although it stands heat well, the air of our drier districts would seem to be too devoid of moisture for its luxuriant growth when not irrigated, during the summer months.

At several places visited it had well established itself along banks of watercourses and had resisted submersion for several weeks.





Mr. W. H. Lang's Lucerne Field, Capel River. (Not irrigated.)

At one place its congener, *Paspalum distichum*, often known as water couch, had completely ousted rushes along the banks of the Vasse River where I have watched its progress for some years past.

One of the best fields of *Paspalum dilatatum* it has been my privilege to see in Western Australia was not entered for competition. This pasture is established in a well-manured cultivation paddock on one of the first farms established on the Margaret River. The seeds (12lbs. sweated for a day with damp sawdust, to assist germination) were sown in April last, after the first rain on ploughed and harrowed land. The paddock was shut down and, towards the end of November, three tons of paspalum hay were cut on 1½ acre of land sown.

Twenty calves—weaners—were then put in the paddock for several weeks and gradually drafted off. On the date of my visit there were still 13 calves and one horse on the pasture, which was quite thick underfoot and could with advantage carry fifty sheep for a few weeks in order to feed down the coarse grass and secure a sweet growth.

Sheep's Burnet, although not properly a grass, is often associated with pasture grasses, and deserves more general attention on the part of our settlers. Around the Vasse it does remarkably well, its strong roots penetrating deep down into the thick loam, which is always moist some distance from the surface.

Other grasses met with in the course of my visit were African Wonder grass, which seems better suited for warmer districts. Johnson grass is well suited for sandy soils. Red, and more especially White, clover is establishing itself well. Melilot, which appears spontaneously wherever the ground has been broken by the plough, is readily eaten by stock when reaching maturity, but in years to come it may give trouble on dairy farms. Above all the omnipresent couch grass, which forms the backbone of the summer pastures around the Vasse.

Lucerne.

Although essentially a crop for irrigated lands, the fields around the Vasse and the Capel are, wherever the lucerne has received proper attention, the best I have met with in the course of my visit of inspection.

That district, like the extensive stretch of land which extends from Bunbury to Albany, is heavily timbered and possesses a deep soil and a cool climate, with a fairly heavy rainfall during the winter and the spring months.

The depth of the ground favours the rapid absorption of the water, but the soil, when cleared and ploughed, remaining more or less damp through the summer months.

The conditions are therefore favourable for root growth, and once the lucerne has overcome the hardships which encompass its first season's growth it becomes an established plant, and yields a larger amount of fodder than any other artificial grasses, even without the stimulating assistance of irrigation.

During my round of visits, I have noted failures, but, on the other hand, have also seen highly successful fields of lucerne on the rich dark marl under tuart, gum, or peppermint, on the Stirling Estate, on the deep brown loam on the river banks of the Capel, mostly under red gums and jarrah on the deep light loam along the course of the Sabina River, where blackbutt, black-boys, and banksias grow thickly.

The chief causes of failure have invariably been due, wherever they were noted, to the shallow ploughing and rough preparation of the ground, to attacks of insects, mainly cut worms, during the early summer, and to the smothering by weeds.

On new land, lucerne following a crop of maize or of potatoes which have been liberally manured, showed a striking contrast with the rest of the field. One single step would take one from fodder growing knee-deep and smothering all vegetation under it to a straggling, weedy, and thinner patch which will take longer to establish.

Well-established lucerne fields yield several cuts annually for several years, and the extra trouble therefore of running in each furrow eight inches deep a subsoiler going a few inches deeper secures a solid foundation which generally makes success a certainty. Whether sown broadcast or in drills, successful fields were seen; the drilling although more costly, accounted for an economy of four or five shillings in seed per acre, the quantity being twelve pounds of seed when drilling, and about sixteen pounds when broadcasted.

More especially in old cultivated fields which may be foul with weeds, drilling appears to be more advantageous, as the sowing in rows facilitates the destruction after a cut of the shallow rooted annuals by cultivation, and also the harrows with pointed teeth breaking of the crust, which freshens up the lucerne.

The seeds used were not in some cases the cleanest, and some fields showed mallaw, wild chicory, and in one instance the troublesome dodder, all introduced with the lucerne seeds.

The importance of only procuring lucerne seeds from houses of the highest repute is almost an essential of success, and yet is not sufficiently appreciated.

At most of the places visited I heard of the loss caused by attacks of grubs in November and December, and evidence could be seen in many corners of the damage done. The presence of these grubs, unless the grower is on the look out for them, is often noticed when a good deal of harm has been done. They are mostly cut worms which come out and feed at night and seek shelter in the ground in the daytime. Yet these grubs are amongst the easiest to kill, their greediness causes them to readily take poisoned bait. They can hardly resist sweetened bran poisoned with Paris green in the proportion of $\frac{1}{2}$ lb. of the poison to one bushel of bran subsequently damped with treacle and water.

This is scattered broadcast over the affected field, in the afternoon, after the lucerne has been cut, raked, and removed. One application is generally sufficient.

The experience of Mr. W. H. Lang, of Capel, who won the first prize in the 3-acre artificial grass competition, and also the best one acre of lucerne, is interesting in that it shows that initial difficulties are often overcome where the natural conditions of soil and climate are favourable.

The 5-acre field is on the bank of the Capel River; it consists of a brown loam 20 to 30 feet deep. The land was under red gums, with a few odd jarrah trees. It cost about £20 an acre to grub and clear it of green timber. After ringbarking, the cost of clearing the dry trees would be about half.

Late in September, 1906, a mixture of 10lbs. of Hunter River lucerne and 3lbs. of *Paspalum dilatatum* to the acre were broadcasted. In November and December, 1906, cut worms devoured the young plants and the January





Mr. G. H. Fenner's Maize Field, Busselton.

and February sun so subsequently checked the growth that Mr. Lang made up his mind to plough up the 5-acre field and sow oats in the winter.

Pressing calls on his teams and on his time prevented him getting at the field early, and when he came up to plough the land he was so surprised at the growth of the lucerne which had revived after the first rain that he decided to leave it alone.

In August, 1907, he commenced cutting lucerne 18 to 24 inches high, and for 120 days subsequently he cut and carted away one load of green lucerne a day for feeding the team horses. He thus got within a year and a quarter of the date of sowing 24 loads of green lucerne to the acre. From January to the beginning of November, 1908, he did not touch the crop, and then cut, dried, and carted to the harvester 8 loads of cured hay weighing over 25 cwt. each, or 10 tons of lucerne hay. Two months after, early in January, 1909, he again took the reaper and binder to the field and on the date of my visit, ten days later, the whole cut crop was still on the ground.

On that occasion I counted 198 stooks of lucerne, averaging 20 sheaves each of lucerne hay, 20 to 30 inches high. I would estimate the yield of this crop at $2\frac{1}{4}$ tons of cured lucerne hay to the acre.

It is worthy of note that although *paspalum* seed was originally sown with the lucerne, the latter has almost completely choked it out, except on land or the higher slope of the 5-acre field where *paspalum* and lucerne still grow together. This field is very clear of weeds.

Altogether, within a period extending a little over $2\frac{1}{4}$ years, these five acres have produced per acre 24 loads of green lucerne and $4\frac{1}{4}$ tons of lucerne hay, and the field is in good heart.

When it is considered that this has been achieved in spite of a check at the start, and under ordinary conditions, and not with the assistance of irrigation, the result is to a high degree satisfactory.

Feed Crops.

Apart from artificial grasses, classes were set apart for peas, rape, kale, mangold, maize.

The field peas did moderately well, and do not call for special mention.

The rape, considering the time of the year—middle of January—was remarkably green, and where the ground had been well cultivated and manured, showed luxuriant growth.

In our South-West districts it is possible to grow that class of crop two or three months later than in the drier wheat-growing areas or the warmer districts north of the Murray River. Expressed in meat value, an acre of rape producing 300 to 400 lbs. of mutton represents a return of £5 to £6 to the farmer.

Of kale, several entries were inspected. The crop is one worthy of more general attention. The continuous growth of leaves along the tall fleshy stems are much liked by all kinds of stock. The plant is hardy, lasts a couple of years, and when it receives generous treatment yields for months in succession a bulky crop of succulent leaves.

Of mangolds there were three entries. Two, Mr. A. D. Mayall, on the Warren Road, and M. G. F. McGregor, at Quindalup, are worthy of particular mention.

At the first-named farm the particular liking of the roots for salt gave evidence of its descent from the wild maritime beet. The land in that portion

of the field where the mangels were planted is too salt for anything else to grow, and consequently there was not even a weed in evidence. The rows were 2ft. 9in. apart, while the plants were set at intervals of 1ft. 3in. in the rows. There was hardly a miss to be seen. The variety sown is Sutton's Long Red, and the fertiliser used bonedust, at the rate of 3 cwt. to the acre. Germination of the seed is much increased by steeping in warm water for a few hours before dibbling in. These were planted towards the end of October last and the prospective crop, which will not be far off 18 tons to the acre, has already been sold to a Vasse dairy farmer at a price which will leave a good profit.

These roots are best allowed to wither in covered heaps after pulling; during that ripening period certain acid substances liable to scour animals being gradually transformed into sugar.

The cultivation of this crop is also one which is worthy of attention, as apart from cut worms in November and December, it is fairly immune from the attack of other pests.

The land which carries the crop mentioned was lately under blackbutt, thick growth of jarrah and banksia, on the edge of a swamp. The cost of clearing was about £6 per acre, with the blackbutt stumps left to stand in the field.

Maize.

Together with lucerne, maize seems to be the fodder crop which receives most attention around the Vasse and through the South-West districts.

Of this there were six entries, all very creditable.

The two kinds "Flint" and "Dent" corn were represented; the first smaller, but with a finer stalk and quicker of growth, the second, taller, coarser, and taking about five months to cob and sufficiently mature.

The cutting of maize before the grain glazes is wasteful. As in the case of other fodder crops inspected, cut worms and other kinds of grub insects had given trouble towards the end of the year.

The first prize field carried as fine Horse Dent maize as could be found even under irrigation. The seeds (three or four) had been dropped at right angles at distances two feet six each way; this arrangement permitting of cross cultivation made it easy to keep weeds under. The land, a light loam, in its natural state under red gums, jarrah, and banksia, with some ferns and prickly acacia, is typical of thousands of acres in the district.

Although the corn was put in without fertilisers, it was about 5ft. high on the date of my visit, and the whole field was even right through. It is expected that the maize, when ready for cutting, will be about 9ft. high; a very satisfactory result considering that no manure was used.

Before concluding, I take this opportunity of complimenting your Association on the system you have this year adopted in offering prizes for the best cultivated fields of green summer fodder. The benefit to the owner is manifest, and to intending settlers in a district which is able to carry succulent crops, without the aid of irrigation, so long through the summer, the competition is also of great value.

It is now recognised that succulent fodder is a certain preventive of "Dry Bible" or impaction of the stomach, which is the cause of loss to stock-owners in the South-West during the summer months. That affection which is an effect of the disease, not the cause, is known in the initial stage to be readily checked by change of pasture associated with a dieting of bone meal.

My visit of inspection in connection with the awarding of the prizes offered by your Association has been rendered even pleasanter by the kindly welcome extended by all competitors to the judge appointed by your Society.

CORRESPONDENCE.

BACON-CURING PICKLE.

Professor Loudon M. Douglas, Lecturer on the Meat Industry at the College of Agriculture, Edinburgh, has been good enough to send us the following information under date 5th January:—

3 Lauder Road, Edinburgh,
5th January, 1909.

The Editor of the Journal of Agriculture, Perth, Western Australia.

Dear Sir,—I notice in your issue of November last which has just come to hand to-day, that you give a recipe for bacon-curing pickle, which I think is hardly on a line with modern practice. The recognised pickle which is adopted now throughout the bacon-curing trade is constructed as follows:—Take 55lbs. of salt, 5lbs. saltpetre, 5lbs. cane sugar, 5lbs. dry antiseptic (preservative); make this quantity up to 20 gallons and boil in an ordinary copper until the scum ceases to rise; skim this off while the boiling is proceeding, then allow the pickle to cool. It should be at the same temperature as that of the cellar in which the curing is being carried on before being put into use. This pickle should test about 100deg. on the Douglas Salinometer, and if it does not reach that density it should be fortified by a little clean salt.

Any quantity of pickle can be made from this recipe, simply by dividing or multiplying the figures, but the rule in making the pickle according to these proportions should not be departed from.

I should be very glad to be of service to any of your readers who are interested in the subject of bacon-curing.

Yours faithfully,

Loudon M. Douglas.

FRUIT CULTURE IN THE NORTH-WEST.

In a letter to the Under Secretary, Mr. H. V. Street, of Marble Bar, writes that the banana suckers supplied to him by the Department, "appear to have rooted at once and are looking very healthy. The chief drawback here appears to be the white ants. If they could only be successfully combated all kinds of fruits would grow here. Oranges, lemons, and dates have been grown in the district, but grapes have not been a success so far. Oranges and lemons occasionally imported are sold at four shillings per dozen, and very rarely pears at one shilling and sixpence per lb., and plums at two shillings. So you will understand that there would be a good market for locally-grown fruit."

[In respect to checking the white ants, the best course to take is constant surface cultivation with harrows and scarifier. The pest can be poisoned by placing in holes sawdust mixed with a small quantity of Paris Green.—Ed.]

GARDEN IRRIGATION.

Mr. R. A. Jose, of Nannine, asks:—"Can you give me any information re underground pipes for irrigating the ground? I believe they are using some at Kalgoorlie. Our ground is of sandy nature, depth 5 to 8 feet; the distance the pipes are put in and depth?"

The Department replies as follows:—"The pipes used on the Gold-fields are the ordinary 2in. agricultural drain pipes. As, however, the cost of these will be somewhat expensive owing to freight, the ordinary galvanised down-pipe is recommended, without being lapped or soldered. This is made of strips 6in. long and 6in. wide and bent round into a circle of two inches. The earth will keep them from opening, at the same time the water can easily escape all along the pipe, the joints of the pipes being turned downwards. By being open they can be packed one inside the other, carrying better and taking up less room when stored. Unless the soil has a fair amount of humus the best results cannot be obtained. A good depth is from 6 to 12 inches in rows from 6 to 10 feet apart, according to nature of soil; the more sandy the soil the closer the pipes require to be laid."

FRANCO-BRITISH EXHIBITION.

AWARDS GAINED BY AUSTRALIAN STATES.

At the request of the Premier, Hon. N. J. Moore, the Agent-General forwarded a list of awards secured by the various States of the Commonwealth at the Franco-British Exhibition, showing how Western Australia compared with the others in the general results with respect to the two highest prizes, viz., the Grand Prix and the Diploma of Honour. Western Australia gained more of the first-class than did Queensland, South Australia, or Tasmania, and tied with Victoria. Of the next class this State secured more than New South Wales, Queensland, South Australia, or Tasmania. In the total awards Western Australia exceeded South Australia and Tasmania, notwithstanding the fact that in consequence of the minerals being mainly shown as a collective exhibit the State only received eight awards in that section. The list of awards is as follows:—

New South Wales.—Grand Prix, 39; Diploma of Honour, 6; gold medal, 101; silver medal, 21; bronze medal, 11; hon. mention, 7; total, 185.

Queensland.—Grand Prix, 18; Diploma of Honour, 5; gold medal, 74; silver medal, 41; bronze medal, 10; hon. mention, 3; total, 151.

Victoria.—Grand Prix, 22; Diploma of Honour, 12; gold medal, 77; silver medal, 29; bronze medal, 12; hon. mention, 68; total, 220.

South Australia.—Grand Prix, 13; Diploma of Honour, 4; gold medal, 55; silver medal, 17; bronze medal, 8; hon. mention, 2; total, 99.

Western Australia.—Grand Prix, 22; Diploma of Honour, 9; gold medal, 45; silver medal, 25; bronze medal, 7; hon. mention, 3; total, 111.

Tasmania.—Grand Prix, 3; Diploma of Honour, 6; gold medal, 40; silver medal, 8; bronze medal, 4; hon. mention, 4; total, 65.

WOOLLY APHIS OF THE APPLE.

(Schizoneura lanigera Hausmann.)

By C. L. MARLATT, Bureau of Entomology, U.S. Department of Agriculture.

GENERAL APPEARANCE AND METHOD OF WORK.

Throughout the summer on the lower portion of the trunk, and particularly on the water sprouts of the apple may often be seen small bluish-white flocculent or cottony patches, which indicate the presence of colonies of one of the worst enemies of the apple, viz., the insect variously known in this country as the "apple-root plant-louse," "Woolly aphid," etc., and abroad very generally as the "American blight"

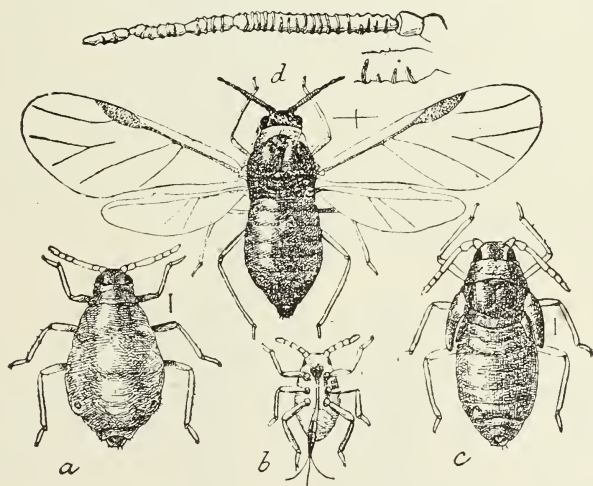


FIG. 1.—Woolly aphid (*Schizoneura lanigera*): a, Agamic female; b, larval aphid; c, pupa; d, winged female with antenna enlarged above. All greatly enlarged and with waxy excretion removed. (Original.)

It exists in two forms, the one just referred to, above ground on the trunk or water shoots, and another inhabiting the roots and not open to observation. Closely paralleling in these particulars the grape phylloxera, the damage from the woolly aphid is also almost altogether due to the root form, the aerial colonies causing scarcely any injury. On the roots its attacks induce enlargements or galls or swellings very similar to those produced by the phylloxera, and in the cracks of these galls and swellings the root form occurs in clustered masses. The injury to the trees is due both to the sucking up and exhaustion of the vital plant juices, and to the poisoning of the parts attacked, as indicated by the consequent abnormal growths.

The damage is particularly serious in the case of nursery stock and young trees, and it is less often important after the tree has once become well established and some size. Where this insect is abundant all the roots of a young tree to a depth of a foot or so become clubbed and knotted by the growth of hard fibrous enlargements, with the result, in a year or two, of the dying of the rootlets and their ultimate decomposition with attendant disappearance of the galls and also of the aphides, so that after this stage is reached, the cause of the injury is often obscure. On the trunks the presence of the aphides sometimes results in the roughening of the bark or a granulated condition which is particularly noticeable about the collar and at the forks of branches or on the fresh growth around the scars caused by pruning, which later is a favourite location. On the water shoots the insects collect particularly in the axils of the leaves, often eventually causing them to fall, and on the tender greener sides of the stems. The damage above ground, though commonly insignificant, is useful as an indication of the probable existence of the aphides on the roots. A badly attacked tree assumes a sickly appearance and does not make satisfactory growth and the leaves become dull and yellowish, and even if not killed outright it is so weakened that it becomes especially subject to the attacks of borers and other insect enemies. Injuries from the woolly aphid are almost altogether confined to the apple, even the wild crab not being so liable to attack or at least injury by it. There is, however, some difference exhibited by different varieties of apple in immensity, and particularly is the *Northern Spy* proof against it, and it is possible that, as in the case of the grape phylloxera, by employing root stock from seedlings of the more resistant varieties or from wild crabs, considerable protection would result. The character of the soil also exerts some influence—that is, loose dry soils are favourable, and wet compact ones are unfavourable to the aphid.

ORIGIN AND DISTRIBUTION.

There is considerable difference of opinion as to the origin of the woolly aphid of the apple. The belief has fluctuated between a European and an American origin for this insect, but the weight of evidence seems to indicate the latter. At any rate, it is an insect which is most readily carried from place to place with nursery stock of the apple, and it has been so transported to practically all the important countries of the world which have been reached by colonization or European settlement. The woolly aphid was first noticed in England in 1787, on some stock imported that year from America, and was early called the American blight. Hausmann described it in 1801 as infesting apple trees in Germany, and within the next twenty-five years it was recognised as a serious enemy of this fruit tree throughout England, Belgium, Northern France, and Germany, but seems never to have been especially notable in the warmer latitudes of Europe.

It was very early introduced into Australia and New Zealand, and is known in India and Chile, and probably is as widespread as any of the common injurious fruit pests. Notwithstanding the possibility of its being a native American insect, it did not attract attention in this country much before 1850. Its spread since, however, has been rapid, and it now occurs practically wherever the apple is grown.

NATURAL HISTORY AND HABITS.

In common with most aphides, the species has a complicated life history, some of the details of which are still lacking. The common forms, both on the roots and above ground, are wingless aphides, not exceeding one-tenth of an inch in length, and of a reddish-brown colour, and abundantly covered, especially in the aerial form, with a flocculent waxy excretion. These are so-called agamic females and reproduce themselves by giving birth, as observed by many entomologists, to living young indefinitely, perhaps for years, without the intervention of other forms. The newly born larvæ have none of the white excretion, which, however, soon appears as a minute down when they begin to feed. These aphides are also peculiar in lacking the honey tubes common to most aphides, but exude the honey-clear-winged, gnat-like objects, greenish brown, almost black in colour, with the body covered with more or less of the cottony excretion.

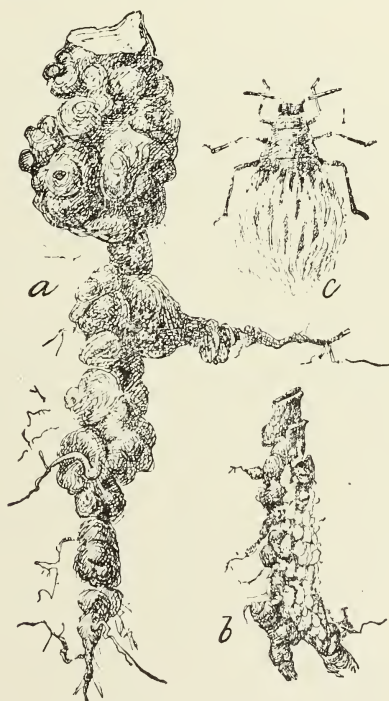


FIG. 2.—Woolly aphis (*Schizoneura lanigera*): *a*, Root of young tree illustrating deformation; *b*, section of root with aphides clustered over it; *c*, root aphid, female. *a* and *b*, Natural size; *c*, much enlarged. (Original.)

The aerial colonies are probably killed out every winter in the colder northern districts, but in the warmer latitudes the partly grown individuals, at least, survive protected in crevices or under bits of bark, and remain more

or less active during winter and renew the colonies the following spring. This has been shown to be true in the district of Columbia, and also in the interior regions of the same latitude, in spite of the much colder winters. The root form survives the winter usually in an immature condition, viz., larvae in various forms are killed by the severity of the winter, and elsewhere it seems probable that there is a regular upward migration in spring and early summer from the roots, the aerial colonies appearing first near the crown, and at a later period on the higher parts of the trees. At any time during the summer and fall there may be migration to the roots, and throughout the year the subterranean colonies are maintained.

The spread of the insect is accomplished in part by the viviparous females, which appear in late summer, but quite as commonly perhaps by the transporting of young or partly grown individuals from tree to tree, or to distant orchards by means of birds or insects to which they have attached themselves. Its wide distribution is usually dependent on the traffic in nursery stock.

REMEDIES AND PREVENTIVES.

The foregoing account of the habits and characteristics of the woolly aphid will enable us to suggest certain measures to control it. The aerial form presents no especial difficulty, and can be very readily exterminated by the use of any of the washes recommended for aphides, such as kerosene emulsion, a strong soap wash, resin wash, etc., the only care necessary being to see that the wash is put on with sufficient force and thoroughness to penetrate the covering and protecting cottony excretion. If the wash be applied warm its penetration will be considerably increased.

The much more important root form, however, is more difficult to reach and exterminate. Any of the remedies which are applicable to the phylloxera will apply to the apple root-aphid, such as the use of bisulphid of carbon or submersion. The common recommendations are of applications of strong soap or tobacco washes or kerosene emulsion to the soil about the crown, or soot, ashes, or tobacco dust buried about the roots, also similarly employed are lime and gas lime.

The most generally recommended measure hitherto is the use of hot water, and this, while being both simple and inexpensive, is thoroughly effective, as has been demonstrated by practical experience. Water at nearly the boiling point may be applied about the base of young trees without the slightest danger of injury to the trees, and should be used in sufficient quantity to thoroughly wet the soil to a depth of several inches, as the aphides may penetrate nearly a foot below the surface. To facilitate the wetting of the roots and the extermination of the aphides, as much of the surface soil as possible should be first removed.

Kerosene emulsion, at 20 to 30 per cent. of kerosene, has given good results in Georgia, as reported by R. I. Smith.

Mr. J. M. Stedman was the first to demonstrate the protective as well as remedial value of finely ground tobacco dust. The desirability of excluding the aphid altogether from nursery stock is at once apparent, and this Mr. Stedman has shown to be possible by placing tobacco dust freely in the trenches in which the seedlings or grafts are planted, and in the orchard excavations for young trees. Nursery stock may be continuously protected by laying each spring a line of the dust in a small furrow on either side of

the row and as close as possible to the tree, covering loosely with earth. For large trees, both for protection and the destruction of existing aphides, from two to five pounds of the dust should be distributed from the crown outward to a distance of two feet first removing the surface soil to a depth of from four to six inches.

Since its early recommendation marked success has been reported from the use of tobacco dust. A notable instance is that given by Mr. M. B. Waite, of the Bureau of Plant Industry, who applied a ton of tobacco waste, costing 25 dollars, in his orchard, with the result of entirely renewing the vigour of his trees, and producing a strong stubby growth of twigs. A peck of tobacco dust was placed about each of his larger trees in a circle of two or three feet around the trunk, and a slightly smaller amount about trees from one to three years old.

The tobacco kills the aphides by leaching through the soil, and acts as a bar for a year or so to reinfestation. The dust is a white product of tobacco factories, and costs about one cent. per pound, and possesses the additional value of being worth fully its cost as a fertiliser.

The use of bisulphid of carbon for the woolly aphid is the same as for the grape root-aphid. It should be applied in two or three holes about the tree to a depth of six to 12 inches, and not closer than $1\frac{1}{2}$ feet to the crown. An ounce of the chemical should be introduced into each hole, which should immediately be closed. The bisulphid evaporates and penetrates throughout the soil, and readily and promptly kills the aphides. It does not, however, furnish any protection from future attacks, and is attended with danger to the tree unless the precautions named are carefully observed. That it is highly inflammable should also be constantly borne in mind. If it is to be used at all extensively, an automatic injecting device should be secured. The chemical costs about 10 cents per pound in 50-pound cans.

Badly infested nursery stock should be destroyed, since it would be worth little even with the aphides removed. Slightly infested stock can be easily freed of the aphides at the time of its removal from the nursery rows. The soil should be dislodged and the roots pruned, and in batches of a dozen or so the roots and lower portion of the trunk should be immersed for a few seconds in water kept at a temperature of 130 degrees to 150 degrees F. A strong soap solution similarly heated or a fifteen times diluted kerosene emulsion will give somewhat greater penetration and be more effective, although the water alone at the temperature named should destroy the insects. This treatment is so simple and inexpensive that it should always be insisted upon by the purchaser if there be any indication of the presence of this insect, and stock exhibiting much damage should be refused altogether.

After planting, if the trees be kept in vigorous growing condition by careful cultivation and, if necessary, proper fertilising, damage from the aphides is much less apt to occur, and the principal danger period, namely, the first two or three years after planting in the orchard, will pass in safety. The value, as a means of protection, of thorough cultivation and good care of young orchards can not be too strongly insisted upon. Vigorous growing trees have a decided power of resistance and are able to sustain with comparatively little damage the presence of the root-aphides, while ill-cultivated and neglected orchards are especially liable to injury.

The woolly aphid is subject to the attacks of a number of natural enemies, including the parasitic chalcid fly, *Aphelinus mali* Haldemann, and the

larva of a syrphus fly, *Pipiza radicum* Walsh and Riley, and also the larva and adult of several species of ladybirds, the larvae of the lace-wing flies, and spiders, etc. In the East a very small brown species of ladybird, *Scymnus cervicalis* Muls., is often present in some numbers, and the common nine-spotted ladybird, *Coccinella 9-notata* Hbst., is also an active enemy of the woolly aphis. The 9-spotted ladybird has been used very successfully in California, on the authority of Mr. Ellwood Cooper, to rid trees of root-aphides, this being effected by colonising the larvae of the ladybird at the base of the infested tree. All the parasites mentioned do much to keep the root-aphides in check, and in the case of old well-established trees are in most instances a sufficient protection, but in the case of young trees and nursery stock, where the damage from the aphis is much more rapid and serious, the use of the direct remedies outlined should not be neglected, and particularly should the nursery treatment be insisted upon.

POULTRY NOTES.

By FRANK H. ROBERTSON.

VENTILATION OF FOWL-HOUSES.

Every year about this time many young birds get into bad health, their principal complaints being roup, colds and chicken-pox. It is troublesome work attending to their ailments, and if cured the birds are thrown back and they are never as robust as when they have grown to maturity without a check. The great thing is to handle the birds properly and keep them thriving well and growing all the time. The two most frequent errors are want of ventilation in the fowl-houses and over-feeding.

How often do we see a mob of well-grown chickens crowding together on the floor of a stuffy fowl-house, many of them good-sized birds which should be on perches. Many poultry-keepers have a rooted objection to allowing their young birds to take to the perches for fear of developing crooked breast bones. It is far better to make health the first consideration and prevent over-crowding by getting the birds on to the perches as soon as possible, where they are cooler and more comfortable, provided of course the house is kept cool by means of ample ventilation. There are different ideas as to what constitutes ample ventilation; a deficiency of such occurs in most cases. The fowl-house should be open fronted, and there should be openings at the back to allow a good current of air to extend just under the roof. Draughts are thus avoided and an ample supply of fresh air provided; and, if possible, in hot weather, a current of air should be made by raising the house from the ground, say, three inches, or removing a small portion of the back wall. The ventilation wants to be regulated according to the size of the fowl-house, the number of birds kept in it and the season of the year. As many birds as the perches will hold can be crowded into a fowl-house provided there is sufficient ventilation to

keep the air cool and pure. As an instance, a house 8ft. long, 6ft. deep, and 6ft. high, with three perches about 2ft. from the ground, will comfortably hold thirty full-grown fowls, provided it is open or wire-netted in front and has a 3-inch opening along the back wall just under the roof.

DECREASED EGG IMPORTATIONS.

It is pleasing to note that our egg importations are steadily decreasing. The value for the year ending 31st December, 1908, amounts to £55,357 and shows a decrease of £7,000 on the previous year.

The following are the figures for the past five years:—

Year.	Dozen eggs.	Value at port of export.
1904 ..	1,773,510 ..	£80,055
1905 ..	1,636,221 ..	£70,628
1906 ..	1,571,055 ..	£64,776
1907 ..	1,434,833 ..	£62,448
1908 ..	1,130,096 ..	£55,357

Our consumption of eggs is not decreasing, but our local production is increasing, not so far as one can see by our general farmers but by the poultry-keepers on the outskirts of the metropolis who have to buy almost everything that the birds consume, which comprises wheat, oats, bran, pollard, grit, animal food, and oftentimes lucerne and chaff when greenstuff is scarce; and if water rates are not paid for windmills or oil-engines and piping are in use; and yet the farmer in the country is so often met with who says that there is no money to be made out of poultry, notwithstanding the fact that he has unlimited ground and grows his own wheat and greenstuff.

CARE OF POULTRY IN HOT WEATHER.

The recent hot weather has occasioned the loss of a considerable number of poultry. This can be prevented by providing bough shelter which is very easily done by sinking four forked posts into the ground and laying across a good supply of green saplings with plenty of foliage on them. If the ground underneath the shelter is well damped by throwing on it a few buckets of water the birds resting on the damp soil can keep themselves cool in the hottest weather. The ordinary V-shaped iron fowl-house also makes a very cool shelter if it is raised a few inches by placing a block of wood under each corner. Iron shelters of this description are very serviceable for young stock; they allow a current of air to blow along the ground and the birds can rest there in the hot weather in comparative comfort.

AN ENGLISH EGG-LAYING COMPETITION.

Particulars are to hand of the first Egg-laying Competition held in England for a full 12 months, but the records attained are very small when compared with our Australian competitions. The scores were as follow:—

- 1.—White Wyandottes, 994 eggs, value £4 19s. 9d.
- 2.—White Wyandottes, 991 eggs, value £4 18s. 4d.
- 3.—White Wyandottes, 946 eggs, value £4 11s. 1d.
- 4.—White Wyandottes, 922 eggs, value £4 11s. 1d.
- 5.—White Wyandottes, 932 eggs, value £4 9s. 7d.
- 6.—Buff Rocks, 950 eggs, value £4 7s. 7¼d.

- 7.—Buff Rocks, 895 eggs.
- 8.—White Wyandottes, 869 eggs.
- 9.—White Leghorns, 843 eggs.
- 10.—Black Wyandottes, 853 eggs.
- 11.—White Wyandottes, 778 eggs.
- 12.—La Bresse, 735 eggs.
- 13.—Barred Rocks, 775 eggs.
- 14.—Houdans, 704 eggs.
- 15.—White Wyandottes, 644 eggs.
- 16.—Buff Rocks, 598 eggs.
- 17.—White Wyandottes, 670 eggs.
- 18.—White Wyandottes, 670 eggs.
- 19.—White Wyandottes, 630 eggs, value £2 14s. 5d.
- 20.—Partridge Wyandottes, 513 eggs, value £2 4s. 1d.

These results look very poor when compared with those of our last Subiaco competition which were as follow:—

- White Leghorns, 1,411 eggs, value £8 2s. 1d.
- Golden Wyandottes, 1,400 eggs, value £8 3s. 8d.
- White Leghorns, 1,295 eggs, value £7 6s. 6¾d.
- White Leghorns, 1,263 eggs, value £6 19s. 1d.
- White Leghorns, 1,260 eggs, value £6 18s. 8d.
- White Leghorns, 1,234 eggs, value £6 16s. 7½d.

The feeding of the birds appears to have been on very similar lines to our local competitions, but the warm Australian climate is no doubt greatly in our favour. Still first-class layers are to be found among the English birds, as the trap next proved five birds to have laid over 200 eggs each, viz., 201, 203, 206, 213, 216. These are good results and by careful breeding much better records would be obtained.

THE EXPORT TRADE.

It will be some years yet before this State exports poultry, and such is not likely to take place until we can supply our own egg requirements, the reason being that the class of birds best adapted for egg-production are quite unsuitable for the English market. I refer particularly to White Leghorns; they are our popular egg-producers, and are more bred than any other variety. Most breeders sell off the cockerels and keep the pullets, but for the English market a plumper class of birds are required, and all such that come into our markets are readily bought for local consumption at prices ranging from 6s. 6d. to 8s. 6d. a pair for fat cockerels.

Although we are doing nothing as regards export, still it is interesting to note what other States are doing in this respect. The South Australians, we note, are working earnestly in opening up outlets for surplus poultry products. At the present time this State is the chief customer for surplus eggs but they are recognising the fact that the day will come when we can produce all we require, and they are straining every nerve to find payable export outlets. The West Australian market is closely watched and supplies regulated according to markets and conditions of weather. For instance, a run of hot weather in Adelaide tells against exporting to the West. The export of eggs is quite in the embryo stage yet, and so far has not led to any direct benefit to the South Australian poultry farmer, as the

net returns realised have been much on a par with the local market rates, but the fact of the withdrawal of a large number of eggs from the market at the glut season of the year has a steadying effect and thus indirectly improves the price to the grower.

South Australia is also endeavouring to open up a market in England for table poultry, and shipped 2,000 head in 1908 against 700 the previous year, and the prospects of obtaining a profitable market for both dead fowls and eggs in England is very good, but it will take a few years' experience to do so.

LECTURES.

The following is the list of forthcoming illustrated lantern lectures on poultry by the writer:—

- 1st March.—Kalamunda.
- 3rd March.—Brookton.
- 9th March.—Wagin.
- 10th March.—Woodanilling.
- 17th March.—Harvey.
- 23rd-26th March.—Darkan District (2).
- 30th March.—Collie.
- 15th April.—Pingelly.

THIRD EGG-LAYING COMPETITION AT SUBIACO.

[Commenced July 1, 1908. To close March 31, 1909.]

Appended, herewith, are the results for the competition which commenced on the 1st July and is to run for nine months, terminating on the 31st March, 1909.

Eggs for sitting from any of the pens are obtainable on application to the Manager at Subiaco; prices range from 10s. 6d. to 21s. per dozen. A price list is forwarded on application, or see the *Journal* for July.

The following are the results up to January 31:—

The figures in black indicate the winner of the monthly prize.

The first column of figures indicates the present position of the pens in the competition.

Pens marked thus * remained in from last competition.

FOWLS.

Six females and one male bird in each pen.

Owner and Breed.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Total.
1 Mrs. A. S. Craig, Black Orpington ...	131	145	129	146	110	117	122	900
2 S. Craig, White Leghorn ...	81	126	133	144	135	137	129	885
3 Mrs. C. F. Schmidt, White Leghorn ...	104	117	127	131	128	134	123	864
4 Sunnyhurst (S.A.), White Leghorn ...	109	111	143	143	111	100	133	850
5 A. H. Padman (S.A.), White Leghorn ...	71	124	146	137	127	120	122	847
6 Gaffney & Bach, White Leghorn ...	102	117	128	136	113	125	118	839
7 Mrs. A. E. Kinnear (S.A.), White Leghorn ...	82	110	136	140	121	112	118	819
8 Mrs. Kynaston, White Leghorn ...	91	130	122	139	108	104	112	806
9 C. Herbert, White Leghorn ...	86	129	133	129	91	106	123	797
10 Mrs. L. Mellen, White Leghorn ...	106	126	133	128	92	83	117	785
11 Homebush Farm, White Leghorn ...	80	107	118	135	121	102	118	781
12 T. W. Martin, White Leghorn ...	76	126	131	129	89	110	118	779
13 Lionhurst Poultry Farm, Buff Leghorn ...	104	116	121	132	99	98	108	778
14 C. B. Bertelsmier (S.A.), White Leghorn ...	94	125	121	121	82	100	132	775
15 A. M. Thomas, White Leghorn ...	77	133	132	133	70	105	124	774

EGG-LAYING COMPETITION—*continued.*FOWLS—*continued.*

Owner and Breed.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Total
16 Greenville Poultry Farm, White Leghorn	97	114	127	118	87	106	121	770
17 J. W. Buttsworth, White Leghorn ...	113	133	117	113	78	91	118	763
18 G. Bolger, White Leghorn ...	49	115	138	139	105	105	110	761
19 Glendonald Poultry Yard, Silver Wyandotte ...	92	117	129	125	99	96	100	758
20 T. Ockerby, White Leghorn ...	62	126	116	129	111	115	97	756
21 Paddy King & Salter, White Leghorn ...	95	101	105	108	104	109	119	741
22 Shamrock Poultry Farm, White Leghorn	82	99	133	31	78	97	121	741
23 Bon Accord Poultry Yard, White Leghorn	94	119	102	116	79	98	110	718
24 E. Garbett, White Leghorn ...	71	129	120	120	85	88	104	717
25 W. Elliot, White Leghorn ...	89	109	109	114	88	103	104	716
26 J. Gaffney, White Leghorn ...	83	106	119	112	102	98	87	707
27 Mrs. Hopley, White Leghorn ...	87	118	111	110	80	91	10	707
28 R. G. Flynn, White Leghorn ...	86	92	88	101	104	106	128	705
29 Mrs. Younger, White Leghorn ...	41	97	121	126	103	97	110	695
30 Mrs. Flynn, White Leghorn ...	78	94	114	111	90	101	105	693
31 Ontario (S.A.) White Leghorn ...	72	82	106	140	75	94	113	682
32 O.K. Poultry Yards, White Leghorn ...	34	105	119	115	92	101	105	672
33 Greenville Poultry Farm, Silver Wyandotte	105	97	107	110	88	76	85	668
34 Coolgardie Poultry Farm, White Leghorn	66	97	110	112	96	92	93	666
35 Honner and Forbes, R.C. White Leghorn	69	99	111	114	85	85	100	663
36 *J. D. Wilson, Brown Leghorn ...	42	84	110	117	104	89	111	657
37 J. R. De Morrison, White Leghorn ...	61	104	108	105	82	90	104	654
38 The Elms Poultry Yard, White Leghorn	51	92	111	124	96	86	92	652
39 Mrs. Hughes, White Leghorn ...	57	92	126	116	75	73	111	650
40 Devine & Migro, White Leghorn ...	58	94	115	121	100	63	99	650
41 *White Wings P.F. (No. 2), White Leghorn	71	93	103	111	63	85	104	630
42 *T. W. Martin (late O. James), White Leghorn ...	62	104	114	93	76	88	87	624
43 Craig Bros., Black Orpington ...	70	97	90	121	96	69	76	619
44 A. E. Champness, White Leghorn ...	40	108	109	110	76	81	94	618
45 G. George, White Leghorn ...	66	96	103	106	85	79	77	612
46 South Perth Poultry Farm, R.C. White Leghorn	61	91	92	108	87	79	90	608
47 *Adelaide Poultry Yard, R.C. Brown Leghorn	62	99	106	96	74	84	82	603
48 T. Hickey, White Leghorn ...	0	84	130	102	64	99	120	599
49 Mrs. McGree (No. 2), White Wyandotte	40	90	108	81	94	86	92	591
50 *Craig Bros. (No. 1), White Leghorn ...	30	93	88	103	81	74	118	587
51 Adelaide Poultry Farm, Buff Leghorn ...	33	82	104	106	87	85	86	583
52 F. Whitfield, Minorca ...	57	71	89	122	83	76	73	571
53 *Mrs. McGree (No. 1), White Wyandotte	49	107	91	99	59	70	87	562
54 Hillview Poultry Farm, White Leghorn	51	92	83	89	81	79	79	554
55 *J. Stuart, Golden Wyandotte ...	69	101	99	103	77	51	41	541
56 *White Wings Poultry Farm (No. 1), White Leghorn ...	52	65	80	96	85	75	84	537
57 *J. Stuart, Silver-pencilled Wyandotte	33	74	101	94	77	60	55	494
58 *Mrs. H. M. Kelley, Gold Wyandotte ...	33	85	96	92	76	65	44	491
59 Craig Bros. (S.A.) (No. 2), White Leghorn	49	81	90	88	61	49	61	479
60 *Mrs. H. M. Kelley, White Leghorn ...	23	68	106	104	60	61	48	470
61 J. Stuart, S.L. Wyandotte ...	57	72	83	62	79	58	46	457
62 R. L. Martin, Black Orpington ...	95	84	69	62	71	41	56	442
63 Craig Bros., White Orpington ...	57	73	60	67	48	54	43	402
64 J. Miller (late Dobson), Silver Wyandotte	34	59	40	38	36	34	25	266

Winner of first monthly prize, Mrs. A. S. Craig, Black Orpingtons, 131 eggs; second month, Mrs. A. S. Craig, 145 eggs; third month, A. H. Padman, White Leghorn, 146 eggs; fourth month, Mrs. Craig, Black Orpingtons, 146 eggs; fifth month, S. Craig, White Leghorns, 135 eggs; sixth month, S. Craig, White Leghorns, 137 eggs; seventh month, Sunnyhurst White Leghorns, 133 eggs.

Winner of first three months test, Mrs. A. S. Craig, Black Orpingtons, 405 eggs.



MOODIARRUP DISTRICT, UPPER BLACKWOOD.
Brooks and Player's Potato Field, Lake Towerrining.



MOODIARRUP DISTRICT.
Mangel-Wurzel Field, Brooks and Player's Farm, Lake Towerrining.

EGG-LAYING COMPETITION—*continued.*

DUCKS.

Six ducks and one drake in each pen.

Owner and breed.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Total.
1 F. Whitfield, Indian Runner	106	148	146	156	132	128	109	925
2 C. Phillips, Indian Runner	101	117	144	150	140	128	99	879
3 *G. Thomson, Indian Runner	131	135	150	142	131	100	88	877
4 *Smith & Davenport, Indian Runner	116	128	136	154	125	99	105	863
5 *Mrs. L. Mellen, Indian Runner	131	141	154	149	101	95	86	857
6 White Wings Poultry Farm, Buff	114	177	162	166	63	101	74	857
7 J. Robertson, Indian Runner	32	108	179	143	139	119	102	822
8 C. W. Johnston, Indian Runner	24	26	120	165	177	143	155	810
9 D. F. Vincent, Indian Runner	119	132	133	177	123	64	57	805
10 *South Perth Poultry Farm (No. 2), Pekin	7	116	160	147	116	120	106	772
11 A. W. Edgar, Indian Runner	12	96	149	152	127	123	103	762
12 C. Geddes, Indian Runner	89	134	134	135	70	92	92	746
13 H. Carr and Son, Indian Runner	142	137	136	118	95	72	43	743
14 Mrs. R. B. Moyle, Indian Runner	132	127	92	113	84	74	92	714
15 Bon Accord Poultry Yard, Buff	54	86	132	137	110	106	75	700
16 Grenville Poultry Farm, Indian Runner... ..	68	85	140	128	47	98	92	658
17 J. Moyle, Indian Runner	114	115	137	102	90	39	52	649
18 South Perth Poultry Farm (No. 1), Pekin	0	50	137	145	139	100	69	640
19 *F. Whitfield (late Disting), Indian Runner	72	48	108	128	127	71	84	638
20 Coolgardie Poultry Farm, Pekin	0	40	143	106	127	118	99	633
21 Adelaide Poultry Yard, Indian Runner	49	105	122	124	91	81	58	630
22 Simplex Incubator Factory, White Indian Runner	4	9	109	162	94	125	122	625

Winner of first monthly prize, H. Carr and Sons, Indian Runners, 142 eggs; second month, White Wings Poultry Farm, Buff Orpingtons, 177 eggs; third month, J. Robertson, Indian Runners, 179 eggs; fourth month, D. F. Vincent, Indian Runners, 177 eggs; fifth month, C. W. Johnston, Indian Runners, 177 eggs; sixth month, C. W. Johnston, Indian Runner, 143 eggs; seventh month, C. W. Johnston, Indian Runners, 155 eggs.

Winner of first three months' test, White Wings Poultry Farm, Buff Orpingtons 453 eggs.

SECOND YEAR'S TEST—FOWLS.

Owner and Breed.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Total.
1 J. Stuart, Golden Wyandotte	69	101	99	103	77	51	41	1,941
2 Craig Bros.' No. 1, White Leghorn	30	93	88	103	81	74	118	1,882
3 J. D. Wilson, Brown Leghorn	42	84	110	117	104	89	111	1,782
4 Mrs. McGree, No. 1, White Wyandotte	49	107	91	99	59	70	87	1,750
5 T. W. Martin (late James), White Leghorn	62	104	114	93	76	88	87	1,699
6 Adelaide Poultry Yard, R.C. Brown Leghorn	62	99	106	96	74	84	82	1,652
7 Mrs. Kelley, Golden Wyandotte	33	85	96	92	76	65	44	1,610
8 White Wings Poultry Yard No. 1, White Leghorn	52	65	80	96	85	75	84	1,432
9 J. Stuart, Silver-pencilled Wyandotte	33	74	101	94	77	60	55	1,419
10 J. Miller (late Dobson), Silver Wyandotte	34	59	40	38	36	34	25	1,299
11 Mrs. Kelley, White Leghorn	23	68	106	104	60	61	48	1,280

SECOND YEAR'S TEST—DUCKS.

		First year.	July.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Total.
1	G. Thomson, Indian Runner	1,571	131	135	150	142	131	100	88	2,448
2	Smith and Davenport, Indian Runner	1,333	116	128	136	154	125	99	105	2,196
3	F. Whitfield (late Disting), Indian Runner	1,493	72	48	108	128	127	77	84	2,131
4	Mrs. L. Mellen, Indian Runner	1,244	131	141	154	149	101	95	86	2,101
5	South Perth No. 2, Pekin	840	7	116	160	147	116	120	106	1,612

THE POSSIBILITIES OF MOODIARRUP DISTRICT.

(J. A. Kinsella, Dairy Expert.)

Early in December last I made an inspection of the Moodiarrup district and gave an address in the local hall to a large number of the residents. The possibilities of this portion of the State for carrying on mixed farming impressed me very much, more particularly for dairying. Like many other districts the land is patchy, but I was astonished to find so much good soil, principally in the number of comparatively rich flats lying along the Upper Blackwood and Arthur rivers. It is my opinion that cheap irrigation schemes on a small scale could be worked in some parts of the district which would result in very profitable fodder crops being raised by the settlers. At Mr. Stewart's farm I found very good crops of wheat and a large acreage under cultivation. This settler has been in the district sixteen years and has done a great deal of clearing, ringbarking, and has also been a wholesale destroyer of poison weed. At the time of my visit he was installing a small irrigation plant for the purpose of irrigating his orchard and other small paddocks. The orchard, although going through a dry spell, was looking well. Mr. Stewart intends keeping his sons with him by allotting them portions of his land, much of which they have worked hard to clear in conjunction with himself. These boys appear to be the ideal class of settler to induce to remain on the land.

At Mr. Horley's place I saw some excellent wheat being harvested, also a number of very fine cows were inspected, and while they were mostly of a beef type some of them that had been selected showed good milking qualities.

Although very few of the farmers have gone in for growing potatoes and other vegetables, yet it is possible to grow many excellent varieties in some parts of this district as will be seen by the accompanying illustrations which were taken on a small property recently acquired by Messrs. Rogers on the borders of Lake Towerrinning and which is capable of producing fairly large quantities of fodder and vegetables when brought under full and proper cultivation.

Many other signs of good progress in the direction of clearing, ringbarking, etc., were met with and I only regret that time did not permit of my seeing all the district. As an indication of what can be done on the high land I would draw attention to the illustration of a crop of oats on Mr. Hull's farm which is almost midway between Darkan and Moodiarrup. Mr. Hull has only been on his selection two years and has already 80 acres under wheat and oats and he is fast clearing more of his land. He had in use an ordinary ship's winch with which he was doing marvellous work, pulling down small and medium sized trees and afterwards hauling them into piles for burning. It appeared to me almost incredible that one man could handle the class of timber which he was dealing with.

I must express my thanks to Mr. T. Silver for the trouble he went to in meeting me at Darkan and driving me through the district, also to Mr. Clussen for supplying me with photographs.



MOODIARRUP DISTRICT.
Herd of Shorthorns, Horley's Farm.

RECIPES.

— — —

Rheumatism in cattle.—Give in warm water, night and morning, a draught containing carbonate of ammonia, 1oz.; bicarbonate of potassium, 1oz.; ginger, 1oz. Rub the parts affected with liniment of belladonna, 1 part; compound of ammonia, 1 part. Give nourishing food and a little linseed meal, and keep free from chills till quite cured.

Colic in horses.—The remedy for this trouble is a bottle of chlorodyne and a tablespoonful of finely powdered carbonate of ammonia in a pint of cold water every four or six hours, until the pain is relieved.

Paralysis.—Often caused by the presence of worms in the blood vessels. Remedy: Build up the system of the horse with nourishing food, and wait until the worms leave the blood vessels and enter the bowels, then they can be expelled by the aid of worm powders.

Sand trouble.—There is great danger in trying to remove sand from the intestines of horses by giving purgatives, as the sand when displaced too quickly is likely to produce colic and end in death. Remedy: Thick pollard gruel well boiled; boiled barley or wheat, given separately, and do not work the horse. A preventive measure is a feed of bran twice a week with a tablespoonful of salt.

POTATOES ATTACKED BY DISEASE.

— — —

A few weeks ago a Brunswick settler drew the Department's attention to the state of his potatoes, of which there were from six to seven acres under cultivation, and which appeared to be attacked by some undetermined disease, seemingly cut-worms. A sample of the tubers was forwarded to Professor McAlpine, Government Pathologist, in Melbourne, for his opinion. Another sample was sent to Mr. Berthoud, manager at Hamel State Farm, who says that the potatoes were badly attacked by a form of "scab" (*Oospora scabies*), a pest very prevalent in the South-West district. Mr. Berthoud states that all seed potatoes should be immersed for two hours in a solution of one pint of formalin to 40 gallons of water. They should then be removed, spread out to dry, and restored in clean bags, or cut and planted in the usual way. After three lots have been so treated the solution should be renewed.

The spores of this fungus will live in the soil for several years, therefore infected land should not be put down in potatoees, mangel, or carrots, for at least four years.

About $\frac{1}{2}$ cwt. of flour of sulphur per acre, mixed with the fertiliser when planting, will be found beneficial.

A reply has been received from Professor McAlpine ascribing the damage to cut-worms, and suggesting the use of large dressings of gypsum and sulphate of ammonia before planting the sets.

DRY FARMING IN SEMI-ARID DISTRICTS.

By W. FRANK MCCLURE.

A great deal of attention is being attracted at this time to a system of agriculture known as "dry farming," which is being successfully used in the semi-arid districts of Colorado and other Western States in place of extensive schemes of irrigation. By "semi-arid" is meant a territory in which the annual rainfall is less than 20 and more than 8 in. By dry farming, many thousands of acres which, on account of their location, could never be reached by irrigation ditches, are reclaimed. Some of this acreage has long been styled "grazing lands," and considered useful for nothing else.

"Dry farming," briefly stated, consists in so preparing the soil in semi-arid regions that it will catch what little annual rainfall there is, and store it within reach of the roots of the plants to be grown. This, as might be supposed, requires a firm, solid foundation beneath the soil. The soil above is kept firm and loose, and acts as a mulch, keeping the moisture from escaping into the atmosphere, much as a brick or plank keeps the ground directly under it moist even in a beating sun. With such preparation of the soil, grazing lands will often yield as high as 40 to 50 bushels of wheat to the acre, or more than the yield of the Eastern States, where the natural rainfall is adequate.

The first operation in the preparation of the soil is ploughing. This must be deep. A disc or a mould-board plough may be used, depending on the character of the ground. One object of the deep ploughing is to provide an adequate reservoir for the storage of the rainfall. Gang ploughs, with twelve to sixteen ploughshares in each, are a common sight. These ploughs are drawn by traction engines.

Steam ploughing helps out wonderfully in this work. In some of the Western States it would be out of the question to secure sufficient men and teams to accomplish the ploughing of the hundreds of thousands of acres annually being reclaimed by "dry farming." Steam ploughing costs less than half as much as ploughing with teams. It is not unusual for one ploughing outfit to turn 3,000 acres of sod into cultivated land in one season. Two men are needed to operate the engine, besides a teamster and team for hauling fuel.

A sub-surface packer follows the plough, drawn by the same traction engine as the plough. This packer is similar in shape to a disc plough, except that it has ten wheels. These wedge-shaped wheels or discs are 18 inches in diameter, and are arranged vertically on a shaft 6 inches apart. The object of the sub-surface packer is to firm the soil. A smooth roller, if used for this purpose, would have the effect of packing the surface soil rather than that of the sub-surface. The wheels of the packer, however, are so arranged that they firm the soil in the lower portions of the furrow, restoring capillarity where ploughing has arrested it. A smoothing harrow next follows, leaving a pulverised layer on top, which prevents the moisture from below from reaching the surface and evaporating.

The constant care and working of the soil on which the crops are to be raised are said to be equally important with the rainfall itself. The pulverised ground must not be allowed to pack or break in any event. To avoid this,

the harrow is run over it after each rain. The working of the soil begins several months before seeding, and must also be continued after seeding.

A great many people, cultivating their land under the new system, aim to raise but one crop from the same ground in two years. They divide this land into two equal parts, and use one part for crops one year, and the other the next. This admits of what is known as "summer culture" on the part not in use, and the storing of a season's rains in the soil reservoir. Again, it may be feasible to allow the land to produce crops for two years, and alternate one year of "summer culture." Where crops are planted every year, ploughing must quickly follow the operation of harvesting, the aim being to save all possible moisture in the ground and simultaneously prepare the soil for the next rains.

It is confidently expected that the time will come when land on which but a 10-inch rainfall is now recorded, will be made to blossom as the rose. This will be accomplished by further advances in scientific discovery. At present, districts having less than 14 inches rainfall are not regarded as profitable. An educational movement for the scientific study of "dry farming" has already been talked of. Not all attempts at "dry-farming" are a success, nor will be, until the mass of the people using it understand the principles on which it must be carried out. The rainfall varies in different years, and this emergency must be met in a scientific way. Conditions differ also in different localities.

The establishment of more Government experiment stations will greatly assist different sections. Several are to be established, it is understood, this year. At Cheyenne, Wyoming, the Board of Trade not long ago established an experiment station, assisted by the Government and the railroads. It was here found that, although Cheyenne is at an elevation of 6,000 feet above sea level, wheat, rye, barley, oats, alfalfa, field peas, and sugar beets can be grown profitably. As a result of the experiments, the ranchmen in Wyoming are buying thousands of dollars' worth of farming machinery, and are breaking up large acreages and sowing alfalfa and other grasses and grains. Ranches are also being sold for colonisation purposes.—*Scientific American*.

PUBLICATIONS RECEIVED.

- Indian Forest Memoirs, Part I., Vol. 1.
- Indian Forest Records, Part III., Vol. 1.
- Review of the San Paulo (Argentine) Museum.
- Handbook of South Australia; Progress and Resources.
- Population and Vital Statistics, N.Z., No. 11.
- New Zealand Official Year Book, 1908.
- Destructive Insects and Pests Acts, etc. (Board of Agriculture and Fisheries, England).
- Annual Report Agricultural Department of New Zealand, 1908.
- The French Garden, Intense cultivation (C. D. McKay).
- Year Book, Rubber Planters' Association, Mexico.
- Eucalyptus in California.
- California Grape root-worm.
- Missouri Botanical Garden. 19th Annual Report.

THE ABERDEEN-ANGUS AND ITS CROSSES.

(From "Banffshire Journal.")

The great outstanding feature of the past Fat Stock Show season was the remarkable success of animals of the Aberdeen-Angus breed, and crosses of that breed. In no year has the round of the shows brought out more strongly the superiority of Aberdeen-Angus blood in beef production than in the season just closed, during the course of which the breed achieved a record which is altogether unique in the history of cattle breeding. While the victories of pure-bred members of the breed were notable, those of the crosses were equally so, and though the favourite mating breed was the Shorthorn, several rather important decisions also served to bring out more strongly the fact that with whatever breed it is mated the Aberdeen-Angus leaves an indelible imprint on the offspring, and transmits to it those properties of beef production which make it the greatest and most valuable of our beef breeds of cattle. We feel sure that a few notes recalling the victories of the breed and its crosses will be of interest.

The season opened with the show at Norwich, and here the crosses of the Aberdeen-Angus breed gave a remarkable account of themselves, sweeping, in fact, everything before them. The best ox in the show was a blue grey Polled by an Aberdeen-Angus bull, and out of a Shorthorn cow, while the reserve was also by an Aberdeen-Angus bull, but out of a Dexter cow, showing how well Aberdeen-Angus bulls can be mated with any breed of cows in the production of the best class of feeding cattle. The best heifer was also by an Aberdeen-Angus bull and from a Shorthorn cow, while a pure-bred Aberdeen-Angus was reserve. Then, for the supreme championship, the Aberdeen-Angus cross heifer was placed at the top, and the Aberdeen-Angus cross ox was reserve, so that in all the principal awards of the show the Aberdeen-Angus breed was the most largely represented. The successes of cross-bred animals at Norwich formed an interesting feature in the records of fat stock exhibitions. Only once in nine years has the East Anglian championship been won by a pure-bred animal, and that was last year, when the winner was Mr. Cridlan's Aberdeen-Angus heifer. Another feature of recent Norwich shows as compared with former years is the large proportion of black or blue-grey exhibits. At the show this year, fifty-three head out of an aggregate of 110 cattle were black or blue-grey and mostly hornless, and if the Red Poll and Shorthorn breeds are excluded considerably more than half of the remainder were of the types alluded to. The proportion in the county and butcher classes showing Aberdeen-Angus influences was equally prominent.

The Birmingham Show was another great victory or rather series of victories for the breed and its crosses. The supreme champion of the show was the Aberdeen-Angus two-year-old heifer from the herd of the Countess of Seafield, this heifer clearing the £25 cup for the best animal bred by exhibitor, the Elkington cup for the best animal, the Thorley cup, the Webb cup, the Maisemore cup, and the prize for the best Scot. In money and cups the prizes won by the Cullen House Aberdeen-Angus heifer represented no

less than £466. The cup for the best yearling was also won by a heifer with an Aberdeen-Angus sire, the same animal having the prize for the best cross. An analysis of the cross-bred classes revealed the marked superiority in numbers and in quality of the Aberdeen-Angus-Shorthorn cross. Of the total entry of thirty-five animals, twenty-six combined Aberdeen-Angus and Shorthorn blood, five were Shorthorn-Galloway crosses, and one each Hereford-Shorthorn, Hereford-Aberdeen-Angus, Shorthorn-Dexter, and Aberdeen Angus-Dexter. But what was even more remarkable was that the whole of the prizes went to animals having Aberdeen-Angus blood in their veins.

The Edinburgh show had a somewhat similar tale to relate, the championship going to a yearling heifer out of an Aberdeen-Angus cow and by a Shorthorn bull, and an Aberdeen-Angus yearling ox was reserve. The best steer in the show was also Colonel M'Inroy's yearling Aberdeen-Angus, while the best heifer was Mr. Arnot's blue-grey yearling out of an Aberdeen-Angus dam. As to the composition of the cross classes it may be noted that of the twenty-seven entries all were of Shorthorn and Aberdeen-Angus breeding, the majority of them being the popular first cross between these two breeds, and the remaining one was a cross by an Aberdeen-Angus bull and out of a Hereford cow. As showing the success of this cross too it may be noted that it won first prize in its class. It should also be noted that the Aberdeen-Angus champion steer was the heaviest yearling in the show.

The London Smithfield Show also resulted in great victories for the Aberdeen-Angus breed. The Cullen House Aberdeen-Angus heifer carried off the championship, thus maintaining the remarkable record of the Aberdeen-Angus breed in connection with these shows, the reserve being by an Aberdeen-Angus sire. Of prizes the Cullen House heifer won £20 as first in its class, the £25 cup as the best of its breed, the £50 cup as the best heifer, the £15 gold medal as winner of the King's challenge cup, the £105 championship plate as the best beast in the show, the £15 gold medal given to the breeder of the champion, besides the King's challenge cup, a valuable trophy to be won twice in succession or three times in all. The best yearling was also by a bull of this breed, and the reserve Col. M'Inroy's pure-bred Aberdeen-Angus. The best steer in the show was a cross by an Aberdeen-Angus bull exhibited by the large South American estanciero, Mr. Martinez de Hoz, while the reserve best steer was the yearling by an Aberdeen-Angus bull. Then the best heifer, which also won the championship of the show, was the Countess of Seafield's Aberdeen-Angus, the reserve in both cases being a cross two-year old heifer by an Aberdeen-Angus sire. The popularity of the cross showing Aberdeen-Angus lines of breeding was shown by the fact that of the forty entries, thirty represented Shorthorn and Aberdeen-Angus lines of breeding, five combined Aberdeen-Angus and Devon blood, three were combinations of the Shorthorn and Galloway breeds, one was by an Aberdeen-Angus and out of a Sussex cow, and one by a Shorthorn and out of a Welsh cow. It will thus be seen that Aberdeen-Angus blood was the most largely represented, cropping up in thirty-six out of the forty animals, and appearing in combination with three different breeds. The breed scored the further victory of carrying off the championship in the carcass competition, the winning animal being a cross by an Aberdeen-Angus bull and out of a Dexter cow—yet another instance of the success of the use of the Aberdeen-Angus in conjunction with any other breed for the production of beef cattle.

Championships at Toubridge, York, Redhill, Chichester, and other shows in the south, and at Aberdeen and Forres in the north, with a reserve champion also at Inverness, go to further swell the great victories of the breed and its crosses at this season's shows in Scotland and England.

The Dublin Fat Stock Show also resulted in great successes for the Aberdeen-Angus cross, a yearling animal of that cross winning the championship, and another by a Shorthorn bull and out of an Aberdeen-Angus dam being reserve. It is worthy of note that both the prizes given by the Hereford Society for the best cross by a Hereford bull were won by animals out of Aberdeen-Angus cows. Like the other leading Fat Stock shows, too, that of the Royal Dublin Society revealed the striking popularity of the Aberdeen-Angus breed in crossing, and constituted also a remarkable tribute to the great development of the breed for beef purposes in Ireland. Taking the whole of the prize-winners in the cross classes, Aberdeen-Angus blood appeared in twenty-two, Shorthorn in fifteen, Hereford in twelve, and Dexter in seven.

Not only did England, Scotland, and Ireland join in bringing out the virtues of the Aberdeen-Angus in the production of the best class of meat, but the verdict of the British Isles was sustained by the results of the great Fat Stock Show at Chicago. There the grand champion of the show was an Aberdeen-Angus two-year-old bullock, the grand champion steer herd were of Aberdeen-Angus breeding, the grand champion carcass was that of an Aberdeen-Angus animal, the lot of fifteen cattle which composed the grand champion earlot were two-year-old Aberdeen-Angus, and at the sales held in connection with the show a lot of Aberdeen-Angus yearling steers brought the highest price of the sale, namely, 54s. 2d. per 100 lbs. There was thus maintained a record of twenty years' standing of the highest selling animals at Chicago being Aberdeen-Angus.

The Fat Stock Show record of 1908, so far as Aberdeen-Angus cattle are concerned, accordingly stands out as altogether unique in the annals of these shows. Never, it is believed, in any previous year has such a preponderating proportion of the highest awards at the leading shows fallen to any breed as has this winter been gained by the Aberdeen-Angus and its crosses with other breeds. The record is one on which breeders of the variety may be justly congratulated, and should go far to enhance the already great reputation of the breed as the premier beef breed of Britain. At a glance, the principal victories of the breed and its crosses may be seen in the following:—

Norwich.—Best ox and reserve, best heifer and reserve, champion and reserve.

Birmingham.—Best yearling, best cross, best Scot, best butchers' animal, championship of show.

Edinburgh.—Best steer, best heifer, champion and reserve.

London.—Best yearling and reserve, best steer and reserve, best heifer and reserve, championship and reserve, champion carcass.

Dublin.—Champion and reserve champion.

Chicago.—Champion animal, champion earlot, champion steer herd, champion carcass.

FEDERAL BUTTER REGULATION.

The following circular has been issued under the Commonwealth Act to all butter factories in New South Wales, and is of interest to local importers:—

“When butter is submitted for inspection—more especially with regard to grading—it is frequently difficult to classify parcels of butter of irregular quality, the result being that the examiner has to classify according to the lower qualities present. If the exporter was in a position to separate each day's butter in these irregular lots a factory would sometimes get superfine for a part, first for some, and second for some, whereas if they are presented as a whole with no identifying marks, the factory runs the risk of the entire parcel being classed as second. To avoid this, factory managers are hereby requested to mark their boxes on the following lines, with a stencil or rubber stamp low down on the left hand corner of the brand:—V 289 over—over 1, meaning butter made from No. 1 cream vat on September 28. This will also prove of great advantage to the factory managers, because under this system of identification the manager will be able to trace defects to their source, while no person outside the exporter and the examining officer will have any idea as to what these marks refer to. Where cream vats are not used manufacturers should place the number of the churn instead, using the letter C instead of V.”

THE DUST SPRAY.

According to the *Pacific Rural Press*, the method of dust-spraying orchards has proved eminently successful, and very largely increased the percentage of fruit crops where it has been adopted. Attention was drawn to the use of dust sprays at the State Fruit Growers' Convention in 1906, and the excellent results which had already followed the use of the machine-sprayed lime-sulphur salt dust. One grower of the Californian coast describing his experience stated that he had “a large almond orchard of over 200 acres which had never been sprayed, and the peach moth larvae had become so bad in it that the 1906 crop showed 40 per cent. worm-eaten. The red spider had also proved quite serious for a year or two before this. We never had had the almond blight in our orchards here before 1906, but we had had the peach blight bad enough to make the 1905 crop very poor on some of the trees, and almost a total failure in 1906. In February, 1907, the almond blight made its appearance, and in four days it had spread over about thirty acres and caused the trees to look as if a fire had gone through the orchard. The peach moth larvae became very hungry in consequence, and as often as a bud showed they promptly ate it up. Having just finished dusting the peach orchard, I turned the machine loose on the almond orchard and dusted all of it. In two weeks we had a beautiful green foliage on the trees, which continued all summer and set a fine growth of buds for the 1908 crop.

We dusted some 200 acres of Sugar and Giant shipping prunes, and were able to ship as fancy packed green fruit 90 per cent. of the crop, which was very unusual. On that portion of our almond orchard which had never been sprayed before, we dusted once for the 1907 crop, and it showed 10 per cent. worm-eaten as against 40 per cent. the year before. In December, 1907, we dusted as a prevention of almond and peach blights, and had practically no blight this year. In February, 1908, we dusted again to catch the peach moth on almond trees. In March we dusted the peach and prune trees for the same purpose. What was the result? After harvesting nearly 80 tons of almonds, 20 tons being shelled, not a single worm-eaten nut was found in the entire crop. I do not think there was a single worm-eaten prune, and we sold over 135 tons of dried prunes, and shipped several cars of green prunes. No curl-leaf and no blight."

Lime dust is used for a carrier instead of water, being much lighter and has the advantage of keeping the chemical poisons as a mixture, and not forming several solutions as when water is used. Every bit of the poison is available when applied in a dry form, while in the wet form it is largely rendered inert by careless preparation, and the consequent formation of several insoluble compounds which are practically worthless. Anyone can mix various forms of dust without spoiling it.

The following are the mixtures:—For blights, peach and almond and curl-leaf—

40lbs. lime,
10lbs. sulphur,
2lbs. sal. Bordeaux.

This makes a good treatment for two acres, and costs about 3s. 6d. per acre, including mixing charge and delivery.

For peach worm larvae and codlin moth, 1lb. of Paris green is added to the above amounts.

Our illustrations show the machine in operation; the manufacturers are the Dust Sprayer Manufacturing Company, Kansas City, Missouri, U.S.A. One machine can spray from 30 to 40 acres in ten hours.

CONTROL OF THE MEAT SUPPLY.

(Loudon M. Douglas.)

The fourth lecture of the series which is being given by Professor Loudon M. Douglas at the College of Agriculture, Edinburgh, was delivered on December 14th, the subject being "The Control of the Meat Supply."

The lecturer stated that there were 51 markets in Great Britain from which returns for live stock were obtained and it was curious to note that the numbers of animals presented for sale at those several markets did not vary very much from year to year. Thus in the department of fat cattle alone, the figures for 1906 were 1,032,259, whereas in 1907 they were 1,060,066; it will be seen that the variation was not great. The imports,



Dust-sprayer at work on trees.



Great spread of Dust-sprayer.

however, from foreign countries had gone up enormously, and it would appear as if the principal source of meat supply, as in other foods, was not in the United Kingdom itself. A comparative statement of the total meat imports for the last three decades showed more strikingly than it could be presented in any other way, how Britain depends upon foreign sources of supply. In 1887 the value of the meat imports was £14,350,000, in 1897 the value had increased to £26,825,000, and in 1907 this figure had gone up to £42,000,000; figures which showed a rapidity of increase which was truly gigantic. The figures presented a new set of conditions in the meat trade and the control of meat from foreign countries would require to be undertaken by the authorities as the principal part of their duties as compared with the inspection of the home supplies.

The lecturer described the methods for the handling of meats in foreign countries and illustrated by means of lantern slides the methods of transport and meat inspection in Holland, the United States, the United Kingdom, and elsewhere. He also pointed out the importance of the by-products, which were scientifically treated in foreign abattoirs, and the organisation of this branch of the meat industry which had still to be done in so far as the United Kingdom is concerned.

There were three people primarily concerned in the meat supply, namely, the farmer, the meat purveyor, and the consumer. The farmer was the producer of the raw material and was entitled to produce live stock which were free from disease. The principal disease to be dealt with was that of tuberculosis, and there was no doubt that it was perpetuated to some extent in the United Kingdom, because pedigree stockowners were obliged to test all pedigree stock intended for shipment abroad. Should such stock react to the tuberculin test, the animals were not slaughtered, but were distributed throughout the home herds, thus perpetuating the disease. This was a matter for State intervention and nothing short of that would effect a cure.

The meat purveyor occupied the position of being the middleman between the farmer and the consumer, and he certainly did not wish to buy tuberculous meat. He was in this position, that he could not make use of any ready test which could be applied to cattle in the market place, so as to demonstrate whether they were diseased, free, or otherwise. He paid his money with the intention of buying sound animals and it was unfair, that should they turn out to be otherwise, he should be at the loss.

The consumer undoubtedly was to be protected both against the farmer and the meat purveyor, and hence our system of veterinary meat inspection, which was being gradually extended.

The various laws governing the meat control in Great Britain were then referred to, as were also the new regulations controlling foreign meats at British ports, and the lecturer pointed out how absurd it was that such regulations should be carried out under the Medical Officer of Health, who was totally unqualified for such an office; the examination of meat was the business of veterinary inspectors, and they only should be appointed to carry out such inspections.

INJURIES TO THE UDDER.

TREATMENT OF WOUNDS.

When a cow comes up from the pasture with one of her teats showing an ugly gash with ragged edges and coagulated blood, there are some important things to be done and some other things that should not be done. For instance, it is wrong, simply to take it for granted that nature will perfectly repair the injury and therefore assume that nothing need be done to help, and it is much worse to deem something necessary and confine the treatment to daubing the wound with dirty axle grease or rancid lard.

Yet this is a common treatment given by the farmer and when the case goes from bad to worse, or the wound heals but leaves a "pipe" which discharges milk at milking time, the owner is apt to blame his bad luck for the aggravated or undesirable condition, instead of understanding that lack of proper attention and medication is the true cause. In a case such as we have mentioned, the first step should be to perfectly cleanse the injured part, using a warm 1-100 solution of coal tar disinfectant, or 1-2000 solution of bichloride of mercury, easily prepared by dissolving druggists' bichloride tablets in water.

At the same time all ragged edges should be trimmed smooth and all shreds and foreign bodies removed, to get the wound into good condition for the healing process which will be conducted by nature. When this has been done, the wound should not be stitched. Putting stitches in the lips of the wound simply makes a number of new wounds of small size, but each of them likely to become infected, filled with pus and, after a time, allow the suture threads to tear out, making a number of unsightly slits which aggravate and render perfect healing less likely to take place.

Instead of using sutures (stitches), dust the wound with anti-septic dressing powder, such as a mixture of one dram of iodoform and three parts each of boracic acid and subnitrate of bismuth. This application will kill germs possibly present in the wound and prevent germs from growing therein, and so nature will be given a proper chance to perfectly carry on the work of repair. Bandaging the teat should be the next step, and it is to be done from tip to udder by putting on a strip of surgeon's plaster just as one would apply a bandage.

First the plaster is heated to make it sticky; then it is wound evenly into place, turn after turn, commencing at the end of the teat and continuing up past the wound, until all of the teat has been covered and protected. The wound is now guarded against the entrance of germs; its edges are held together by the plaster; rest is insured and nature rapidly mends matters. Were the wound left open, dirt and germs would enter constantly, and milking would aggravate the condition so that healing would not readily take place.

Protected by the bandage or plaster, nothing can enter the wound, and the teat may be handled as soon as the plaster has cooled off. At first the milk should be drawn off with a clean milking tube, but in two or three days milk-

ing can be done by hand without disturbing the bandage, and in ten days the plaster may be removed, and the wound then will, in most instances, be found healed.

We have advised the use of a "clean milking tube." This is all important. A dirty milking tube is an abomination and a common cause of infection of the udder and ruinous inflammation resulting from the germs so introduced.—(*Wisconsin Experimental Station.*)

BULLETINS ISSUED BY THE DEPARTMENT OF AGRICULTURE.

Settler's Guide, 2nd, 3rd, 4th and 5th editions.

Handbook of Horticulture and Viticulture (A. Despeissis). 2s. 6d. and 1s.

New Dairying ("Agricola").

Diseases of Honey Bees (John Sutton).

What can be done by the Beginner on the Soil (Hon. James Mitchell, Minister for Agriculture).

Stack Silos (A. Despeissis).

Report of Proceedings of Conference of Producers, 1907.

Factory Dairying (J. A. Kinsella).

Vegetable Growing (G. Chitty Baker).

Examination of the W.A. Poison Plants (E. A. Mann).

Care and Treatment of Milk and Cream (J. A. Kinsella).

Hints to Stock-breeders (Weir).

Meat Inspection and Diseases of Animals (J. B. Cleland, M.D.).

Poultry, Care and Management of (F. H. Robertson).

Back volumes *Journal of Agriculture*.

Tobacco Cultivation (H. Allerton Cowper).

Cotton-growing (H. Allerton Cowper).

Dingo Trapping.

The New Sun-Dial (W. E. Cooke).

The Silo on the Farm (J. A. Kinsella).

Conference of Producers, 1908—Report of Proceedings.

Diseases of animals and Meat Inspection (1908) (J. Burton Cleland, M.D., Ch. M., Sydney).

Trypanosomiasis and other diseases of camels (J. Burton Cleland, M.D., Ch. M., Sydney).

Free copies of such publications as have no prices attached can be obtained on application.

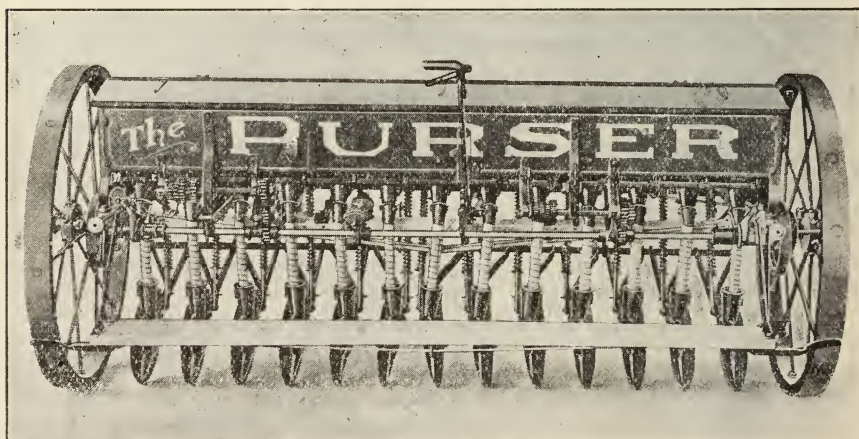
"THE PURSER DRILL."

This machine is manufactured in this State by Messrs. Richard Purser & Co., 83 King Street, Perth. It is made of tubular steel and is the outcome of practical local experience extending over twenty years on the rough uneven country frequently met with in Western Australian agricultural districts.

The interesting features of the Purser Drill are:—

- (a.) The axle does not revolve, being placed directly under the hopper where strength is required, forming part of the frame and giving the best possible foundation to the drill.
- (b.) It is of light draught with proper set and gather. The wheels are hung on taper axles, and both are drivers.
- (c.) The axle arms can be cheaply replaced when worn.
- (d.) The positive spur gearing is placed at the back and always in sight. Changes of quantity can be made quickly, and there are no loose gear wheels to carry.
- (e.) Change gears are interchangeable for either grain or fertilisers. The range of quantities is wide, as for example, in wheat from 20lbs. upwards, and fertilisers 17lbs. per acre to 3cwt. per acre.

Farmers will judge from the above brief description, and the accompanying illustration, of the value of this machine for local conditions. Fuller information can be obtained from Messrs. Purser & Co., the manufacturers.



THE CURCULIO BEETLE.

Inspector G. W. Wickens reports that during December he visited Dalgarrup orchard in Bridgetown district, and experimented with arsenate of lead in proportions of 3lbs. to 50gals. of water as a spray for the destruction of the Curculio beetles (*Otiorynchus cribicallis*). The pear tree treated was of fair size and the pest eating the leaves greedily, instead of the bark as was the case the previous year. This time the spray has proved much more effective owing to the greater quantity of poison consumed with the leaves. A large number of beetles were found dead under the tree.

The inspector, however, states that great numbers of the insects were still sheltering during daytime in the soil around the trunk, and feeding on the tree at night. The spray at its best seems to be only a slight check, therefore in order to make headway against the pest, trapping by every possible means must be resorted to.

The spray did no injury to the foliage.

BACTERIA.

(“Mark Lane Express.”)

We hear so much nowadays about the activity, beneficent or otherwise of bacteria, that a little information about them and their habits will interest many of our readers.

Bacteria are unicellular organisms, the most lowly-organised members of the vegetable kingdom. The word unicellular may be more fully explained. Everything living, animal or vegetable, is made up of cells or the products of cells—just as a brick wall is made up of individual bricks. As the brick is the structural unit of the wall so is the cell the physiological unit of the living structure. The difference between the cells of highly-organised animals and those of unicellular creatures is that, in the former case, different groups of cells take on special functions: one group digestion, another sensation, etc., while obviously the single cell—of which the unicellular creature is composed—has itself to carry out all the functions necessary to its existence. Bacteria, then, consist of a single cell, and they are considered to belong to the vegetable kingdom.

They exist in three fundamental shapes:—

1. The simplest possible, a sphere or ball. These spheres, each known as a “coccus,” may remain quite separate or may be grouped together in various ways—in pairs, clumps, or chains.

2. Elongated or rod-shaped structures, what is properly referred to as a “bacillus.” This may be of various degrees of elongation from an oval to almost a thin filament.

3. The rod may be curved or spiral, forming what is called a spirillum.

They are very minute. We can hardly realise how much so. On the average it would take about 15,000 of them to stretch the length of an inch.

They live by taking fluids into their substance and extracting from them what they require for their nutriment; thus they must be in at least a moist environment, and in the absence of moisture bacterial activity ceases. They also form substances known as ferments just as do the higher animals. We are familiar with those formed by the latter, as pepsin, rennet, etc. The function of these ferments is to modify organic substances so as to render them assimilable or directly fit for food for bacteria. It is in the performance of this function of assimilation that they are such a powerful force in Nature; their food is always dead organic matter of some sort.

Their method of reproduction may be referred to as of general importance. When bacteria find themselves under congenial conditions with plenty of food material they proceed to multiply. This is for the most part a simple process of fission or division, the structure simply divides into two parts, each similar to the parent. Under favourable conditions this process is repeated by the new individuals in from 20 to 60 minutes, so that it will be seen at once that multiplication is a marvellously rapid process with bacteria; for, obviously, starting with one individual, at the end of an hour there will be two; at the end of another hour four; at the end of another hour eight, and so on till at the end of twenty-four hours it is 16,000,000. As a matter of fact conditions hardly ever allow of such increase under natural circumstances, though it probably often occurs under laboratory conditions, which are very different.

THE AVOCADO.

(*Alligator Pear.*)

This is one of the best, if not the best, of all tropical fruits. It could be largely grown in the tropical North-West of this State. It is the most easily digested, and is most wholesome and nourishing. It contains over 10 per cent. of fat, in a form that the most delicate persons can partake of it with a relish when they cannot partake of animal fat. It is an upbuilder of the system, nervous as well as muscular. It requires very little coaxing of the palate for one to become extremely fond of it. The avocado is a salad fruit, and is prepared with any and all kinds of condiments, according to taste. It welcomes olive oil, lemon or lime juice, the ordinary salad dressing, or white pepper, salt and vinegar. A favourite way to serve it is to halve the fruit, remove the seed and skin, cut the meat into cubes about one inch in size and add the dressing. It can be eaten out of the skin with a spoon, with a slight sprinkling of salt, and pepper and vinegar if desired.

An epicurean way of enjoying the fruit is to fill the cavity, after removing the seed, with port wine, adding a little sugar, if preferred, and partake of the contents slowly with a spoon. It will also be found a pleasurable condiment with a tender steak or chop.

The avocado would prove a welcome addition to our local markets, and the breakfast table.

COWPEAS ON SANDY SOILS.

(Prof. C. G. Hopkins, Illinois Experiment Station.)

It is true that cowpeas draw heavily upon both the phosphorus and potassium of the soil. Furthermore, about nine-tenths of the entire mature plant is above ground, consequently, if the entire crop is removed from the land much phosphorus and potash will thus be removed from the soil and the roots and stubble will contain but little if any more nitrogen than the amount of nitrogen taken from the soil on land that will produce even 15 or 20 bushels of corn to the acre. Cowpeas always take nitrogen from the soil in preference to taking it from the air, and, if the soil will furnish sufficient nitrogen for 15 or 20 bushels of corn, it will certainly furnish as much nitrogen to the cowpea crop as will be left in the roots and stubble. Of course, the roots and stubble will furnish some active humus, which as it decays will help to liberate additional supplies of plant food for the use of other crops, and when these are removed the soil becomes still poorer.

Cowpeas may deplete fertility.—To a different degree this is the general result of growing clover in crop rotation when both the hay crop and the seed crop are removed and nothing returned to the soil. Indeed, in most old countries clover has been used in this way until the soils have absolutely refused to grow clover. This condition is already approaching on many of the older cultivated soils of Illinois. Where cowpeas have been grown for many years in the southern part of this State, farmers already report that cowpeas kill the soil.

On the other hand, it is important that legume crops shall be grown, among which clover is undoubtedly the best for use in rotations on the ordinary land, while cowpeas and soy beans are the best for sandy soils, but these crops must be returned to the land either directly or in manure. It should be remembered that one ton of dry clover hay or of dry cowpea hay will add about three times as much organic matter to the soil as will be added in the manure made from the same amount of hay.

In practice about the same relation will hold for the nitrogen removed in the crop and returned in the manure, although with the greatest possible care, as by using large amounts of absorbent bedding, so as to save all of the liquid manure, about three-fourths of the nitrogen can be returned to the soil in live stock farming. About the same proportion holds for phosphorus, while in the case of potash practically the entire amount consumed in the feed can be recovered in the manures.

On most of the sandy soils a liberal use of ground limestone, two to five tons per acre, will be especially helpful for cowpeas and other legume crops. The evidence thus far secured strongly encourages the conclusion that alfalfa can be grown successfully on these sandy lands if liberal use is made of ground limestone and manure or green manures in order to give it a good start.

GRAPES FOR EXPORT.

SUCCESSFUL EXPERIMENT WITHOUT COOL CHAMBERS.

A very interesting experiment has been made by the "Fruit World," of Melbourne, with a view to test the keeping qualities of grapes and the method of packing for the markets in Great Britain and Europe. There is a certain Spanish grape grown in the Almeria district, and called the Ohanez or Casta de Ohanez, of which large quantities are grown for export, no less than 2½ million barrels being despatched from that district of Spain last year to England, Germany, America, and elsewhere.

The "Fruit World" imported to Melbourne from London a keg of Almeria grapes on the assumption that if the grapes could cross the equator to Australia and arrive in good condition they would keep equally well if exported from Australia to the markets of the old world. The keg was opened at the Government cool stores, Melbourne, on 8th December last, in the presence of the Secretary for Agriculture (Mr. Duffus), the viticulture expert (Mr. F. de Castella), the chief inspector of fruit (Mr. J. G. Turner), representatives of the Press, and a number of city fruit merchants and others. The gross weight was found to be over 60lbs.: the empty cask (made of oak staves, and measuring 15 inches diameter by 16½ inches deep) weighed 12lbs., the cork dust packing 8¾lbs., and the grapes over 40lbs. The grapes weighed rather less than had been expected due to evaporation on the long voyage; but they were otherwise in splendid condition, only one bunch showing any signs of decay. The carrying qualities of these grapes is evidenced by the fact that this keg was carried as ordinary cargo from Spain to London and thence to Australia.

The "Fruit World" says that the experiment was highly satisfactory. The grape proved a very handsome one, fresh, firm and sweet, and the taste as fresh and pleasing as if picked the day the cask was opened, in fact, the bloom was still on the fruit, although twelve weeks had elapsed since the picking date.

No treatment of any description is given these grapes before shipment. They are simply picked a little on the unripe side and carefully packed in granulated cork. Although in Almeria the grapes ripen about October, the packing and shipping go on until the end of December, and even much later, this being possible because the Ohanez grape hangs so well. Of course it would not be absolutely necessary that export from Australia be conducted with barrels, although the barrel or keg, having no corners, is very convenient.

Mr. de Castella expressed the opinion that most grapes at present cultivated in Australia would be too thin-skinned for export as ordinary cargo. On his return from his recent visit to Europe, he brought cuttings of the Ohanez grape, and these are now being propagated at Rutherglen. A correspondent of the "Fruit World" suggests that the most suitable of our varieties for an experiment would be the Dorodilla.

MILCH COWS—PRODUCTION AND FODDER.

(“Mark Lane Express.”)

Every operation on a farm, the application of fertilisers, the employment of concentrated foods, the use of expensive machinery, have as their justification and object the production of a crop, or stock, or milk or some other produce at a lower cost than the amount of money expended to obtain it, and this may be said to be specially the case with the production of milk. The highest ratio of productivity is aimed at, combined with economy in the use of concentrated food stuffs.

This desirable result can only be obtained by the man who keeps a careful and exact record of his farming accounts; he must be able to tell—

1. How much milk each individual cow produces.
2. The percentage of fat in the milk produced.
3. What is his expenditure on fodder.

With those three factors before him, the farmer can tell the cost of the gallon of milk from each cow, and will soon find that the cost varies considerably with the different cows; he will also be able to form a reliable opinion which is the most economical fodder judged by the results. He will gain the valuable information as to which fodder ratio produces the biggest yield of milk of the best quality, without upsetting the health of the cows, and at the same time is cheap.

His accounts will also show which cows have the best milking capacity. With them he can afford to be liberal with food, so as to maintain them in the highest state of productivity.

It must be admitted that it requires time and attention to keep such exact accounts, but it is well worth the trouble. It is the only certain way of distinguishing between cows which are profitable and those which are wasters. A bad cow requires just as much fodder and occupies as much room as a good cow. The general charges—such as risk, interest, attendance, housing, etc.—are practically equal, but the profit obtained from the bad cow is much less, and it will be found by keeping a careful record that the bad cow often leaves the balance on the wrong side, so that it seems essential to keep a record of each cow, and gradually weed out the bad milkers.

Cows with good milking capacity must be correspondingly well fed. Every animal requires a certain amount of nourishment to keep it alive and in good health. That may be called its “maintenance” food. The fodder which it digests in excess of the “maintenance” quantity is that which is converted into milk, or increase of weight, as the case may be, and represents the profit of the farmer. Thus the more food we can get the animal to take and digest, the greater should be the profit.

In the selection of fodders, the most important are the albuminoids and fat. These constituents produce milk in abundance and of good quality. In the hay, straw, roots, etc., produced on the farm, the nitrogenous substances are too low for intensive effect either on milk or fattening. Such farm fodder must be liberally supplemented by concentrated foods if the best results are to be obtained.

At the same time we must not forget that the effect of fodder, however rich, is limited.

The chief thing is to be sure that your herd of cows have a good milk capacity. This depends on the character of the individual cow, and can only be ascertained by keeping a record of the yield of each cow, and replacing any that are found to be unsatisfactory.

GOVERNMENT LABOUR BUREAU.

REPORT FOR 1908.

Mr. James Longmore, superintendent of the Government Labour Bureau, in the course of his report on the work of the bureau and its branches for the year ended December 31, 1908, says:—

“The year just closed has been the most successful year since the establishment of the bureau nearly 11 years ago, both as regards engagements and registrations. There can be no doubt as to the benefit of the bureau to the unemployed. It has brought the worker looking for employment and the employer looking for help together, and has reduced unemployment as far as it can be reduced to a minimum, and has supplied the demand for workers to the fullest extent. Although there was some agitation throughout the year by men who had failed to find work, it can be said without hesitation that so far as country work was concerned, a good capable man at any time throughout the year could have found almost immediate employment. The number of applications received from private employers shows their confidence in the bureau and its officers to obtain for them suitable workers, the total for the year being 2,341, an increase of 200 over the previous year.

Registrations and Engagements.

“The registrations for the year in the central office for men in Perth numbered 6,587, being 1,502 in excess of the total for the previous year. At the women’s branch, Perth, the registrations were 1,253. The registrations for men and women at Kalgoorlie was 473 (men 360, women 113), at Northam 225, at Fremantle 102. The engagements at the central office, Perth, numbered 3,872, being the largest total yet reached since the bureau was established. The percentage of applicants who found work had increased from 55 to 59. The engagements by the Government were 713, and by private persons 3,159. The engagements at the women’s branch, Perth, were 867, at Kalgoorlie 84 (men 77, women 7), at Northam 73, at Fremantle 26, the grand total registrations being 8,640, and engagements 4,922. On October 28 a branch of the Labour Bureau was opened at Fremantle for one afternoon each week, and at the end of the year 102 registered for employment and 26 found work. If it is found necessary this office will be opened more frequently.

Railway Passes.

“At the central office, Perth, there were 1,605 men assisted by railway passes to employment, at Fremantle 25, at Northam 4, and at Kalgoorlie 52; total, 1,686; as against 610, or 1,076 beyond the total for year 1907. The cost of passes amounted to £1,435 5s. 7d., as against £437 2s. 6d. for 1907.

Of this amount £669 0s. 3d., or 46 per cent., has been refunded. A great number of fares advanced during November and December are not yet due, and it is expected that at least a further 10 per cent. will be received. A refund of from 80 to 90 per cent. was received for fares advanced to men who found work through the bureau. An additional sum of £31 6s. 6d. was received as a refund for the previous years, the whole amount refunded being £700 6s. 9d. There were also 110 men and women sent to work from the central office whose fares were forwarded by employers, amounting to £108 18s. 6d. At the central office the total number of men supplied with railway tickets, either provided by the Government or employers, was 1,673, the grand total of persons assisted with fares being 1,796, as against 770 for year 1907, or an increase of 1,026 at a cost of £1,544 4s. 1d., as against £641 0s. 3d. for 1907. With the exception of a very few the above passes were supplied to persons to proceed to private employment. In addition to the 1,796 passes there were upward of 500 passes supplied to men by the Lands Department to proceed to Government ringbarking.

General Remarks.

"A report for the year ending June 30, 1909, will be published, and will include the usual returns showing the conditions of the labour market and other details."

OPERATIONS FOR JANUARY.

Following is the report of the operations of the Labour Bureau for the month of January, 1909:—

Perth.

Registrations.—The total number of men who called during the month in search of work was 978. Of this number 556 were new registrations and 422 renewals, *i.e.*, men who called who were registered since the 1st July, 1908. The trades or occupations of the 978 applicants were as follows:—Labourers 353, handy lads 89, farm hands 84, handy men 75, cooks 49, carpenters 43, miners 30, painters 26, bushmen 23, engine-drivers 16, gardeners 16, clerks 13, grooms 12, bakers 8, butchers 7, drivers 7, blacksmiths, hotel hands, ironmoulders, strikers 6 of each, fitters, station hands, yardmen 5 of each, bricklayers, carters, dairymen, kitchenmen, plasterers, teamsters 4 of each, carpenters (rough), engineers, farm managers, firemen, mechanics, orchardists, seamen, stonemasons 3 of each, bootmakers, ironmongers, plumbers, shearers 2 of each, and miscellaneous 32.

Engagements.—The engagements for the month numbered 416. The classification was as follows:—Labourers, 121, bushmen 98, sawmill hands 25, farm hands 24, handy lads 24, handy men 17, woodcutters 16, cooks 15, miners 12, carpenters 10, lads for farms 7, bakers 5, ironmoulders 4, painters 4, engine-drivers 3, fencers 3, hotel hands 3, blacksmiths, groom-gardeners, gardeners, grooms, horse-drivers, survey hands, yardmen 2 of each, and 11 miscellaneous.

Fremantle

Registrations.—The applicants for work were 45. The new registrations numbered 33 and the renewals 12. The classification was:—Labourers 24,

handy men 12, bushmen, carpenters, and kitchenmen 2 of each, one each cooks, engine-drivers, and handy lads.

Engagements.—There were 12 engagements, viz., Bushmen 3, labourers 9.

Northam.

Returns not to hand.

Kalgoorlie.

Registrations.—The new registrations numbered 17, and the renewals 16, total 33. The classification was:—Labourers 11, handy men 8, miners 4, engine-drivers 3, carpenters, fitters, and grooms 2 of each, and one handy man.

Engagements.—The engagements numbered 5, viz.:—Miners 2, carpenters, engine-drivers, labourers 1 of each.

The female servants who called numbered 7. There were two new registrations and 5 renewals. The classification was:—Generals 3, one each cook, housekeeper, housemaid, and waitress. There were no engagements.

Women's Branch, Perth.

Registrations.—There were in connection with this branch 69 registrations and 52 renewals, total 121. The classification was:—Laundress-charwomen, 31, housemaids 19, cooks 17, light generals 13, useful girls 8, generals 8, housekeepers 7, lady helps 5, nurses 4, waitresses 3, pantrymaids 3, cook-laundress 2, married couple 1.

Engagements.—The engagements were 72, classified as follows:—Laundress-charwomen 48, generals 5, light generals 4, cook-laundresses 3, cooks 3, housemaids 3, waitresses 2, lady helps, housekeepers, useful girls, nursemaids 1 of each.

General Remarks.

The number of individual men who called at the Central Office, Perth, during the month in search of work was 978. Compared with the month of January of the previous year, this shows a decrease of 324.

The engagements for the month totalled 416. Of this number 379 were for private persons, which is 104 in excess of that for January last year. Government work accounted for the employment of 37 men.

During the month there were 317 men assisted by railway passes at the Central Office, Perth, at Fremantle 12, at Kalgoorlie 6. The fares refunded totalled £58 19s. 7d., and the sum of £9 18s. was received from employers to send workers, the whole amounting to £68 17s. 7d.

JAMES LONGMORE,

Superintendent Government Labour Bureau.

4th February, 1909.

MARKET REPORTS.

GENERAL SUMMARY.

FARM PRODUCE.

The market has not shown much activity, being very sensitive, and there has been unusual lowering of prices, though supplies have been well forward. Quotations up to last week (ending February 13) ranged as follows:—

Chaff.—Prime, £4 to £4 12s. 6d.; good, medium, £3 17s. 6d. to £4 2s. 6d.; oaten straw, £3 5s.; oaten chaff, £4.

Wheat.—Prices have been speculative, and little prime milling offered. Smutty sold from 3s. to 3s. 6d. Some samples at 3s. 8d.

Potatoes.—Country lots, £7 per ton, 5-ton trucks.

LIVE STOCK.

Messrs. Elder, Shenton & Co., Limited, report a hardening tendency in the market with good turnover, supplies being ample. Lambs diminished, and pigs holding back. Demand for store stock has been maintained, and country sales fairly brisk.

Horses.—Light sorts, £14 10s. to £18; medium draught, £25; others, £3 10s. to £8.

Cattle.—Stores, £3 12s. 6d.; yearlings, £1 17s. 6d.

Sheep.—Wethers, 14s. to 15s.; ewes, 13s. 10d., 16s. 1d., 10s. 6d., 5s. 10d.; mixed, 12s. 4d.; lambs, 6s., 8s., 10s. 6d., 11s. 6d.

Pigs.—Porkers, 21s., 27s. 6d.; slips, 16s.; weaners, 7s. 6d.

METROPOLITAN PRODUCE MARKET.

Fruit.—Apples, dessert, 7s. 6d. to 12s.; cooking, 4s. to 6s. 3d.; inferior, from 2s. 6d. Pears, William, 6s. 9d. to 9s. 3d.; cooking pears, 2s. to 5s. Peaches, 5s. to 9s. 6d.; inferior from 2s.; peaches, quarter cases, 2s. 6d. to 3s. 9d. Plums, 5s. 6d. to 9s. 3d.; plums, quarter cases, 3s. to 3s. 9d. Passion, 4s. 9d. to 6s. 9d.; inferior from 2s. 6d. Quinces, 3s. 9d. Tomatoes, 3s. to 6s. 6d.; inferior from 1s. Grapes, black Muscats, open, 7s. 3d.; black St. Peter, 4s. 6d.; White Nice, 3s. 6d. to 5s.

Vegetables.—Cabbage, 14s. 9d. to 16s.; others, from 7s. 6d. Potatoes, 7s. 6d.; others from 5s. to 8s. 9d. Pumpkins, I.B., 4s. 9d. to 8s.; pumpkins, T.C., 7s. Marrows, 1s. 8d. to 2s. 4d. Parsnips, 1s. 8d. to 2s. Carrots, 11d. to 1s. 3d.; others, 6d. Turnips, 10d. to 1s. 5d. Beet, 3d. to 5d. Peas, 3½d. to 4d. French beans, 2½d. to 4¾d. Celery, 1s. 5d. to 1s. 11d.; others, from 6d. Cucumbers, 3d. to 8d. dozen. Onions, brown, 8s. 3d. to 8s. 9d.; onions, white, 6s. to 8s. 3d. Rhubarb, ½d. to 1½d. Watermelons, 3s. to 7s.; others, from 1s. Rockmelons, 2s. to 5s.; others, 9d. Lettuce, 10d. to 1s. 4d.

Poultry.—Cockerels, 3s. 6d. to 8s. 6d.; small cockerels, 2s. 6d. to 3s. 6d.; hens, 3s. to 7s. 3d. Ducks, 4s. 9d. to 6s.; Muscovy, 8s. 6d. Chickens, 1s. 3d. Pigeons, 1s. 4d. pair.

LONDON MARKETS.

Messrs. W. Weddell & Co. report as follows under date London, January 15:—

Wool.—The market continues strong in Bradford for all grades of wool, and a feeling of security in the soundness of the position of the raw article is generally prevalent, all the more so as advices from the various Colonial selling centres all point to firm markets.

Prospects for the coming sales appear encouraging, especially for coarse wools, which will not be in large supply for another month or so, and stocks of the manufactured article are by no means excessive. America can be confidently looked for in the market next sales, as she has a lot of leeway to make up on her last year's purchases.

Grain.—English Wheat.—The country markets are firmer, and an advance of 6d. to 1s. per qr. is generally quoted. The average price last week of 32s. 9d. per imperial qr. marks an advance of 7d. per qr. from the previous fortnight, but is 2s. 5d. per qr. lower than at the same time last year.

Wheat Cargoes.—Apart from rather more activity towards the close of last week, trade generally during the past fortnight has been quiet, with prices ruling in favour of buyers.

Australian Wheat.—*Ex Store*.—There is a rather better demand but prices show no change. We quote:—40s. to 41s. per 496 lbs.

New Zealand Wheat.—*Ex Store*.—We quote nominally:—Shortberry, 35s. to 36s.; and Longberry, 37s. 6d. to 38s. 6d. per 496 lbs.

New Zealand Oats.—*Ex Store*.—The demand is quiet, but prices remain fairly even. We quote good Canadians, Gartons, and Sparrowbills at 22s. 6d. to 23s. 6d. per 384 lbs.; Duns, 20s. to 21s. per 336 lbs.; and Danish, 16s. to 16s. 6d. per 320 lbs.

Frozen Meat.—General Market.—Trade at Smithfield has been quiet during the fortnight, and plentiful supplies of fresh-killed beef, mutton, lamb, and pork have been selling at low prices, curtailing the consumptive demand for frozen meat. Marketings of home-grown mutton are heavy, and that description is only realising 5¾d. to 6½d. for Scotch, and 5d. to 6d. for English. Dutch mutton is freely offered at 4¼d. to 5d. per lb. Sides of States beef realise 5¼d. to 6d. per lb.; but Canadian ranch sides cannot be quoted at more than 4¼d. to 5d. per lb.

The usual slackness in the demand for frozen meats during the opening weeks of each year is now being experienced, and in consequence of supplies being fairly plentiful, prices are barely steady at a low level.

The supply of lambs in Australia is pinching out unexpectedly early; and cables received this week advise that cold, wet weather in Canterbury is keeping back lamb supplies and will curtail shipments in January.

Mutton.—New Zealand.—Arrivals during the past two weeks amount to 90,565 carcasses. Canterbury sheep under 48 lbs. and 48/64 continue to realise 3⅞d. per lb., but for the 64/72 lbs. grade 3⅝d. per lb. is the current quotation. Best quality North Island sheep are in request at 3¾d. per lb., and heavies at 3⅝d. per lb.

Australia.—Arrivals amount to 69,428 carcasses during the fortnight. Numerous sellers have been offering this class of mutton, and, in order to effect the fair number of sales which have been made, it has been necessary to further reduce values of all weights. To-day's prices are 2⅞d. per lb. for light weight carcasses, and 2¾d. to 2 13-16d. per lb. for medium and heavy sheep.

Lamb.—Arrivals during the fortnight consist of 272,684 carcasses from Australia, 8,676 carcasses from New Zealand, and 36,975 carcasses from South

America. The demand for lambs thus early in the year is not sufficiently brisk to absorb present receipts from Australia; and, to stimulate sales, prices have been further reduced in the case of the lower qualities. Lambs of choice quality are not plentiful, however, and are steady at 5d. to 5 3-16d. per lb. (the latter price for the "Champion" brand). Useful Melbourne, Sydney, and Adelaide lambs realise only 4 3/8d. to 4 1/2d. per lb.; fair quality, 4 1/4d.; inferior parcels, 3 1/2d. to 4d. per lb. The foregoing prices are all for lambs under 42 lbs. Carcases over 42 lbs. range from 3 3/4d. to 4 1/2d. per lb., according to quality.

GARDEN NOTES FOR MARCH.

GARDEN RUBBISH.

The nondescript material gathered together in all gardens may and should be turned to a very valuable use. The rankest of weeds and rubbish may be converted into valuable dressings for vacant land, if only charred by fire. This is very necessary where weeds have been cleared off the land and thrown into heaps. The bulk may appear in a decayed state, and in a fit condition to wheel back on to the land and dry in. Not so. This practice is followed by some, but they do not stay to think of the great evil that may and would result from such a slovenly practice. The weeds indeed may be quite decayed, but not so their seed, and to return the same to the ground without having first been passed through the fire would prove a very great mistake. The whole garden and surroundings should be cleared up of all rubbish and committed to the heap, making a thorough clearance of much which is an eyesore. In this way one creates a valuable dressing for vegetable crops, pot plants, and surface dressing.

Delightful weather has prevailed for the most part of the present summer, very favourable for the preparatory work of the garden and the cleaning up and destruction of weeds and rubbish. Land intended for sowing should be worked up and made ready for the rains. Drains can be put in and trenching commenced. Stable manure can be used for sub-soiling. Orchard and fallow land should be well stirred and cultivated. All seeds saved for sowing can be carefully dried, including pumpkin, melon, tomato, and other kinds, keeping each variety well separated.

All kinds of early vegetables can be sown in this month, viz., Broccoli, Brussels sprouts, cabbage, carrot (early sorts), cauliflower, celery, endive herbs, kale, kohlrabi, leek, lettuce, mustard, onion, parsley, parsnip, radish, turnip, and white beet; also broad beans, peas (early), potatoes (early).

Asparagus beds can be prepared. Cabbage, cauliflower, celery, lettuce, and mushroom spawn can be planted out.

FLOWER GARDEN.

In the flower garden, where care and attention are required, planting or sowing operations can be engaged in, especially with hardy annuals, of which there is a long list where selections can be made with the assistance of the nurseryman. Bulbs can be planted.

FARM NOTES.

Sowing operations in the farm can be directed to Cape barley, kohlrabi, lucerne, mustard, rape, rye, vetches, trifolium, etc.

Rainfall for the month of January, 1909, recorded at telegraphic stations in Western Australia, and averages.

STATIONS.	*Total for January, 1909, in points.	No. of wet days.	Average for January, 1909.	No. of Years Records.	STATIONS.	*Total for January, 1909, in points.	No. of wet days.	Average for January, 1909.	No. of Years Records.
TROPICS :					NORTH COOLGARDIE				
Wyndham ...	340	7	862	22	FIELDS :				
Turkey Creek ...	492	15	683	11	Sandstone ...	567	7	...	...
Hall's Creek ...	292	12	594	18	Wiluna ...	478	6	142	10
Fitzroy Crossing ...	134	5	684	15	Mt. Sir Samuel ...	264	5	112	8
Derby ...	220	6	753	23	Lawlers ...	352	4	77	12
Broome ...	282	4	554	19	Mt. Leonora ...	530	5	53	11
La Grange Bay ...	32	3	403	18	Mt. Malcolm ...	534	4	64	11
Wallal ...	38	3	326	12	Mt. Morgans ...	431	4	57	9
Condon ...	463	3	308	19	Laverton ...	391	5	88	9
Bamboo Creek ...	63	8	326	11	Murrin Murrin ...	379	4	69	10
Marble Bar ...	374	5	250	14	Yundamindera ...	414	6	85	8
Warrawoona ...	...	...	176	9	Kookynie ...	268	5	80	7
Nullagine ...	71	4	327	11	Niagara ...	255	4	57	12
Port Hedland ...	204	6	182	11	Menzies ...	309	5	47	12
Whim Creek ...	310	7	213	11	Mulline ...	318	6	73	7
Roebourne ...	342	5	263	22					
Cossack ...	305	3	202	27	COOLGARDIE GOLD-				
Fortescue ...	418	5	181	21	FIELDS :				
Onslow ...	990	5	51	23	Davyhurst ...	223	6	46	7
Winning Pool ...	1051	7	111	11	Goongarrie ...	281	6	56	13
WEST COASTAL :					Broad Arrow ...	211	6	30	11
Carnarvon ...	37	6	33	26	Kurnalpi ...	220	7	51	12
Sharks Bay ...	116	2	17	15	Kanowna ...	176	8	38	13
Wooramel ...	108	4	55	10	Bulong ...	167	8	31	12
Hamelin Pool ...	128	3	14	23	Kalgoorlie ...	116	6	33	13
Northampton ...	98	4	16	27	Coolgardie ...	146	5	34	16
Mullewa ...	135	9	43	13	Burbanks ...	204	6	29	10
Geraldton ...	59	4	15	32	Widgemooltha ...	152	6	33	11
Greenough ...	85	2	5	27	Norseman ...	57	2	32	12
Dongarra ...	68	2	8	25	Boorabbin ...	95	3	23	14
Minginew ...	87	5	5	13	Southern Cross ...	78	3	32	19
Carnamah ...	255	6	34	21					
Dandarragan ...	112	2	22	11	S.W. COASTAL :				
Moora ...	101	2	13	11	Gingin ...	70	3	24	20
Walebing ...	108	3	20	25	Kalamunda ...	28	2	...	...
New Norcia ...	99	2	11	26	Guildford ...	39	3	27	29
MURCHISON FIELDS :					Perth Gardens ...	21	2	34	33
Peak Hill ...	681	9	114	11	„ Observatory ...	22	1	31	12
Abbotts ...	819	8	90	10	Fremantle ...	19	1	23	31
Gabanintha ...	344	5	111	9	Rottneat ...	55	1	22	27
Nannine ...	466	7	90	14	Rockingham ...	20	1	53	11
Cue ...	355	7	66	14	Jarrahdale ...	4	1	45	26
Day Dawn ...	519	7	62	13	Mandurah ...	13	1	24	19
Lake Austin ...	501	7	57	11	Pinjarrah ...	21	1	34	30
Lennonville ...	715	8	52	8	Collie ...	25	3	30	9
Mt. Magnet ...	440	6	38	14	Brunswick Junct. ...	17	2	...	...
Yalgoo ...	297	6	27	12	Bunbury ...	5	1	52	32
Murgoo ...	389	6	29	20					

*100 points=lin.

RAINFALL—continued.

STATIONS.	*Total for January, 1909, in points.	No. of wet days	Average for January, 1909.	No. of Years Records.	STATIONS.	*Total for January, 1909, in points.	No. of wet days.	Average for January, 1909.	No. of Years Records.
S.W. COASTAL—con- tinued.					S.W. INLAND—con- tinued.				
Donnybrook ...	9	2	39	8	Arthur ...	36	3	17	18
Busselton ...	2	2	44	28	Wagin ...	41	3	14	18
Cape Naturaliste ...	2	1	46	5	Katanning ...	43	3	23	17
Karridale ...	14	3	87	15	Broomehill ...	28	3	27	18
Cape Leeuwin ...	21	7	72	12	Kojonup... ..	61	3	23	24
					Greenbushes ...	70	3	50	16
S.W. INLAND :					Bridgetown ...	66	2	46	21
Kellerberrin ...	49	3	13	16					
Meckering ...	113	2	15	11	SOUTH COASTAL :				
Newcastle ...	74	2	20	29	Mt. Barker ...	156	8	53	22
Northam ...	104	2	17	28	Albany ...	67	8	69	32
York ...	84	3	17	32	Breaksea ...	36	11	47	19
Beverley ...	55	2	13	26	Bremer Bay ...	36	4	37	24
Brookton ...	63	4	...	...	Hopetoun ...	17	3	29	7
Wandering ...	48	3	14	20	Ravensthorpe ...	27	5	37	7
Pingelly ...	25	1	16	18	Esperance ...	63	4	63	25
Narrogin ...	11	1	23	17	Israelite Bay ...	41	8	54	24
Marradong ...	167	3	29	11	Balladonia ...	85	6	49	18
Williams ...	34	2	18	24	Eyre ...	16	3	76	24

*100 points=lin.

REMARKS ON THE RAINFALL FOR JANUARY 1909.

The rainfall during the month shows a large deficit throughout the Kimberley districts and the Eastern portion of the North-West division extending southwards to Nullagine. A general excess however is shown over the remaining portion of the North-West division and throughout the Coolgardie and Murchison Fields, particularly on the North-West coast, between Onslow and Winning Pool and on the Murchison between Peak Hill and Abbotts. Scattered thunderstorms fell in the Kimberley district the first few days of the month and general rain was recorded throughout the State on the 6th in connection with a disturbance which came in at Condon on the 5th. Very heavy rain was also recorded on the North-West coast and the Murchison and Coolgardie Fields on the 7th and 8th, the heaviest falls being registered between the North-West coast and the Murchison; Lake Austin recording 249 and Day Dawn 232 points on the 6th, whilst Condon on the 7th recorded 415 points. From the 8th to the 15th no further falls were noted over the Fields, and only scattered thunderstorms were recorded in the Kimberley and on the North-West coast, Broome registering 253 points on the 12th and Wyndham 157 points on the 14th. On the 16th light to moderate scattered thunderstorms were noted over the Coolgardie goldfields, while on the 18th another disturbance affected the North-West coast and later extended to the Fields. Onslow registered 300 points on the 19th and 536 on the 20th., Winning Pool on the latter date recording 703 points. This gradually passed inland, through the Murchison and Coolgardie Fields, moderate to very heavy rain being

recorded on the 21st and 22nd, Abbots registering 675 points and Peak Hill 460 points for the two days. From the 23rd to the end of the month only a few light scattered showers have been registered in the Tropics and Fields.

Throughout the South-West and South the rainfall during the month has been in excess of the average for previous years, with the exception of West and South coastal areas from Perth southwards to Leeuwin and thence eastwards to Hopetoun, as well as in the neighbourhood of Narrogin.

The greater part of the fall between the 6th and 8th in connection with the disturbance before mentioned, the heaviest fall on the 6th being recorded at Northam, when 91 points were recorded, whilst Mt. Barker on the 8th registered 116 points. With the exception of one or two light scattered showers fine weather prevailed till the 17th, when showery conditions were experienced in the extreme South-West and South. On the 18th thunderstorms were reported at isolated places, the heaviest being at Maradong, where 156 points fell. From that date to the end of the month only a few light showers have been recorded, chiefly on the south coast.

Published by authority under the direction of—

H. A. HUNT,
Commonwealth Meteorologist.

EDITORIAL REQUEST.

Correspondence and Queries are invited from subscribers and readers of the Journal on any subject of interest to agriculturists and other settlers on the land, either conveying useful information or seeking it. Suitable letters and contributions will be published and answers to queries given in the succeeding issue, if communications are received by the Editor not later than the fifteenth of each month.

Secretaries of Agricultural Associations, Societies, and Farmers' Clubs are kindly requested to supply corrections of the lists published in the Journal, such as changes of appointments, dates of shows and meetings, as well as any other items of interest.

PLAN OF SHEEP DIPPING BATH AND DRAINING YARDS

WILLIAM COOPER & NEPHEWS,

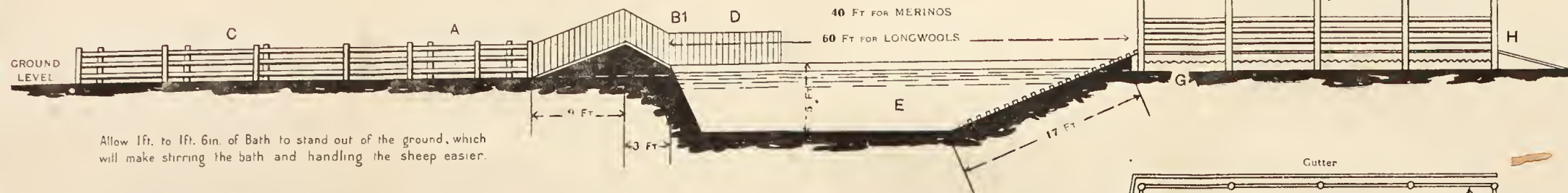
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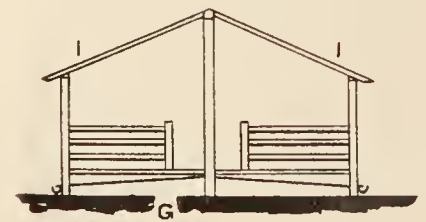
SPECIFICATIONS

In Concrete, Bricks, Iron and Timber, will be found in Cooper's Sheep Dipping Baths Publication, which may be obtained on application to WM COOPER & NEPHEWS, 10, Bligh Street, SYDNEY, 555, Collins Street, MELBOURNE, and 24, Swanson Street, AUCKLAND, N. Z.

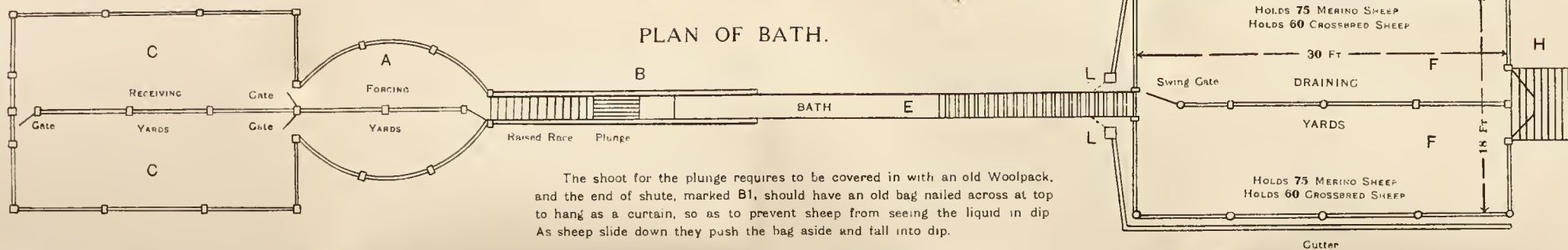
ELEVATION OF DIPPING BATH AND DRAINING YARDS.



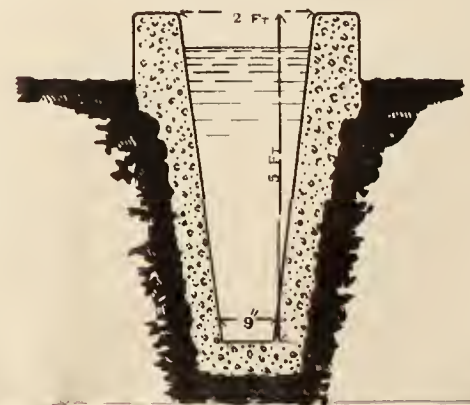
END VIEW OF DRAINING YARD.



PLAN OF BATH.



ENLARGED CROSS SECTION OF BATH.



A—Forcing Yards B—Raised Race and Plunge C—Receiving Yards D—Splash Boards 10-ft. long, 2-ft. high. (Sheets of Galvanised Iron.) E—Dip, 40-ft. or 60-ft. x 5-ft. deep. See cross Section for width.
F—Draining Yards G—Galvanised Iron under grating of Draining Yard to collect drainings. H—Draining Yard Exit. I—Roof Corrugated Iron, Brushwood, or Tarpaulins. L—Draining Wells to separate droppings and allow only clean liquid to return to Bath

N.B. Roofing or covering on Draining Sheds is necessary when dipping is done in very hot weather, and should always be provided for in hot climates.

"WALK-IN" BATH.

A and B are Supply and Crush Pens which are fed from the usual Sheep yards, with which the former should be connected. The latter should have a battened floor, the battens being made in sections, so that they can be removed after dipping.

C Race 9 ft. in length, 16 inches wide, sufficient to hold 4 sheep. This Race should have a battened floor, to be removed after dipping.

D represents the Walk-in section and is an incline 9 feet in length, gradient 1 in 2, ending in a drop 12 inches above the bottom of the Bath. Its width at the point at which it connects with the Race, is the same as that of the Race itself, namely 16 inches, thence it gradually widens to 24 inches, to connect with the Bath at the other end, and of which, it practically forms a part. The sides of the Walk-in section are also, in all respects, identical with those of the Bath.

E Swim Bath, as given in the Cooper Bath Book &c.

a b c represent gates. a and b are 4 to 4½ ft. gates, hung on posts, 3 ft. or 2½ ft. from the side fence, so that when open, they will close up the angles and form a "lead in" c is a small gate to close the four sheep in the Race.

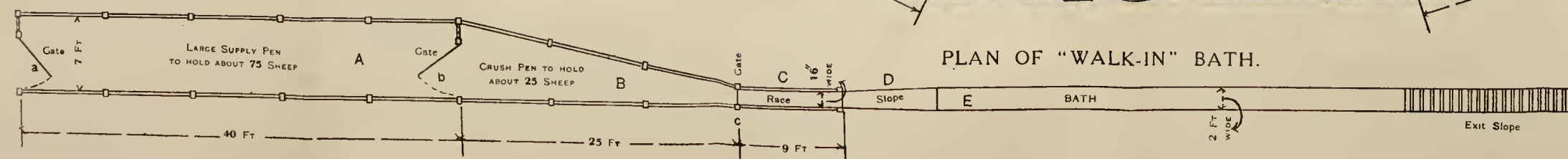
N.B. All these gates, especially the last, should be Drop Gates.

NOTE. Some Sheepowners prefer the Pens and Race in the form of a curve leading to the Walk in entrance

SECTIONAL ELEVATION OF "WALK-IN" BATH.



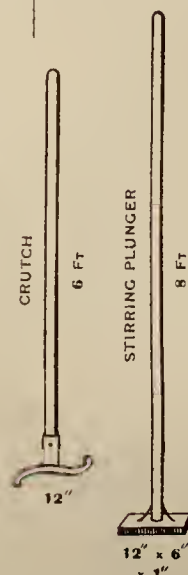
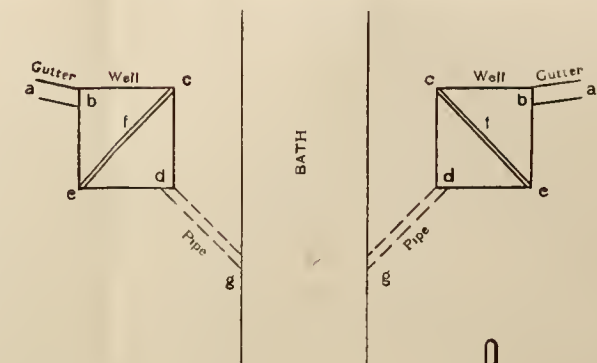
PLAN OF "WALK-IN" BATH.



DRAINING WELLS

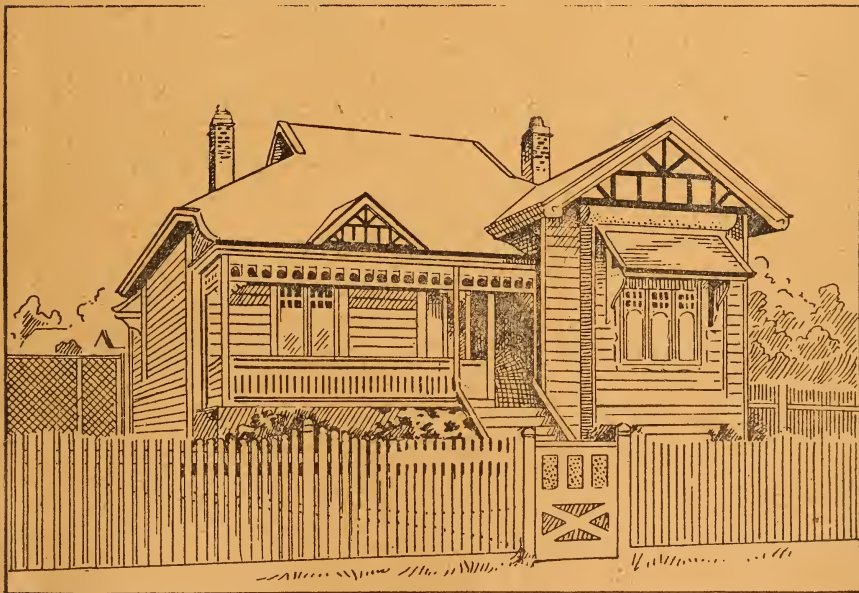
These are absolutely necessary adjuncts to Dipping Baths in order to prevent waste, but they must be so constructed as to prevent soil running into the Bath. The gutters from around Draining Pens from which at b let the bottom fall to 2 feet deep at d, f being a strainer of strong perforated zinc, (1 or ½ inch holes,) dividing the well from top to bottom at ce where, in the centre, it will be 1 foot deep, rising gradually to ground level at c and e, to facilitate cleaning out dung, &c. The pipes g should run from d at the bottom of the wells to the landing stage below the lowest dipping level.

Any simple contrivance, so long as it is effective, will do to prevent rain water from running from the Draining Pens into the Bath



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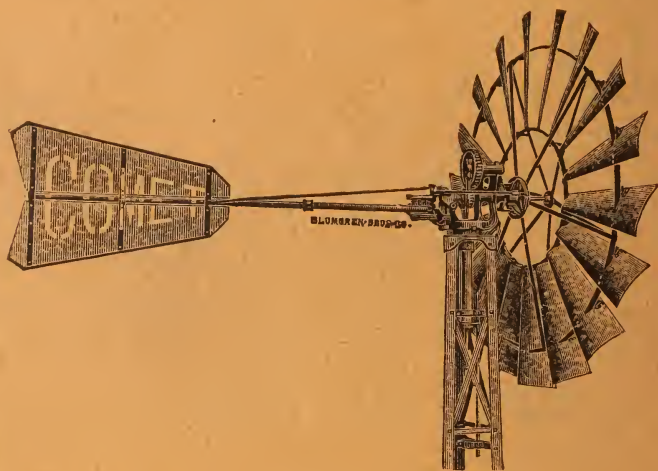
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- Jarrahdale and Serpentine Agricultural Society—
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- (c.) Homestead Farms; or
- (d.) Such other real or leasehold property as the Trustees may think fit.

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No advance shall be made to discharge an existing mortgage to an amount exceeding three-fourths of the value of the improvements already made on the holding. The improvements recognised for this purpose are :—Ringbarking, clearing, fencing, draining, and water conservation. Advances are not made for "completion of purchase"; liabilities which have been incurred in the development of the security only being recognised.

At no time shall the advances to any one person (or number of persons if borrowing conjointly) exceed the sum of £500, and no sum exceeding £100 shall be advanced to any one person for the purchase of breeding stock. In applications for this purpose, the condition and capability of the security to successfully carry stock is of paramount importance.

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Every application for an advance must be made on the Bank's forms, and shall contain all particulars required thereon.

Applications may be for sums of £25 or any multiple thereof, not exceeding £500. Each application must be accompanied by a valuation fee of 1 per cent. of the amount applied for. No refund of fee is allowed after an inspection of the security has been made.

Mortgages are prepared free of charge, but borrowers are required to pay the statutory charges in connection with their registration. These are:—

- (a.) Stamp Duty of 2s. 6d. for each £50 of the amount of mortgage up to £300; and
- (b.) A registration fee of 5s. for each Conditional Purchase or Homestead Farm Block mortgaged.

The Leases or Occupation Certificate, as the case may be, together with the above fees, must be in the possession of the Bank before a mortgage can be prepared.

NOTICES OF APPROVAL are insufficient for this purpose.

Intending borrowers are requested to note that no advances except for the specific purposes of discharging liabilities, or for purchasing breeding stock, are made against improvements effected prior to date of application. Applications should, in every instance, be lodged prior to commencement of work, and moneys are then paid over in progress payments as the work proceeds.

Repayments of loans extend over a period of 30 years, except in the case of stock advances, which have a currency of seven years only. Interest is charged at the rate of 5 per cent. per annum. payable half-yearly.

To the MAN ON THE LAND.

Are your Wife and Children fully provided for in case of your Death?
What would be their position with that advance from the Agricultural Bank undischarged?

Effect a Life Policy with the AUSTRALIAN MUTUAL PROVIDENT SOCIETY.

Follow the example of Hon. Jas. Mitchell, Minister for Agriculture, the holder of Policy No. 130373.

Actual Results:—	£	s.	d.
Policy effected in December, 1885, under Table A for	300	0	0
Bonus additions to 31st December, 1906	175	18	0
Full sum assured to date	475	18	0

And Bonuses will continue to be added each year.

Annual Premium, £5 15s. Total Premiums paid to 31st December, 1906, £126 10s.

In case of death, the Society would *Return* as Bonuses the *Total Premiums Paid*, with a further sum of £49 8s. added. The full sum assured, £300, would also be paid to the member's representatives.

DELAY IS DANGEROUS. ASSURE AT ONCE.

DIRECTORS IN WESTERN AUSTRALIA:

HON. G. RANDELL, M.L.C., Chairman; JAS. MORRISON, Esq., J.P., Deputy Chairman;
JOHN F. STONE, Esq., J.P.; CHARLES HUDSON, Esq.

GAVIN LUCAS, Resident Secretary.

Office: ST. GEORGE'S TERRACE, PERTH.

District Office: Maritana Street, Kalgoorlie
(J. G. Holdsworth, District Secretary).

Local Agencies at Albany, Bunbury,
Geraldton, Northam, York.

A. W. DOBBIE & Co., HAY STREET, PERTH.

"DOMO" CREAM SEPARATORS,

Half the price of others and much better.

SPRAY PUMPS FOR ALL SIZE ORCHARDS.

PARTICULARS AND CATALOGUES ON APPLICATION.

Perth's Fashionable Tailors Cut Suits to your Measure.

None but skilled and experienced workmen ever find employment in our cutting room. Cutting from measurements taken by the customer is necessarily more difficult and particular work than if we had measured you ourselves, but long experience has made our work wonderfully accurate.

We guarantee Fit, Materials, Style and Workmanship.
Our Prices are absolutely Lowest for Reliable, Satisfactory Tailoring.

A postal request will bring patterns and self-measurement form by return. Write to-day.

A. J. SHACKELL & Co., 698 Hay Street, Perth.

'Phone 1224. Box G.P.O. 26.

WESTERN AUSTRALIA.**Prominent Liberal Provisions in Land Laws**

—AND—

CONCESSIONS TO SETTLERS.

1. A Homestead Farm of 160 acres. Application fee, £1; survey fee, £3; stamp, 1s. Conditions: Personal residence for six months in each of the first five years after survey, or residence on C.P. lands within 20 miles. Boundaries: Half to be fenced within five years; the whole within seven years. Improvements: 4s. per acre must be expended in the first two years, 6s. per acre during next three years, 4s. per acre during last two years, making total of 14s. per acre in seven years.

2. Conditional Purchase Lands.—From 100 acres to 1,000 acres at from 10s. per acre, payable in 40 half-yearly instalments at the rate of 3d. per acre. Conditions: Personal residence for 5 years, one-tenth of boundaries to be fenced within two years, the whole within 5 years, and improvements to the full value of purchase money to be made within 10 years. Half the value of boundary fence may be allowed in estimating value of improvements. Conditional Purchase Lands may also be selected without the condition of residence, in which case the improvements in value must equal one and half the amount of the purchase money, but not exceeding £1 10s. per acre.

3. Land for Orchards, Vineyards, or Gardens, from 5 to 50 acres, from 20s. per acre, payable in three years. Improvements, including fence, to be completed in three years.

4. Full particulars as to conditions, areas, and further methods of obtaining land will be found in the pamphlet "Selector's Guide," obtainable on application to the undersigned.

5. Surveys are carried out by the State at half cost to selectors.

6. The Agricultural Bank renders monetary assistance to enable settlers to effect improvements when land has been substantially fenced.

7. On a selector proceeding to any district for the purpose of selecting land, the nearest Land Agent will supply all information, plans, and pamphlets, as well as a guide to conduct him to available land free of charge. In the event of an application for land being made, with the necessary deposit, a refund of railway fare may be obtained, if the deposit on land selected is equal to 50 per cent. more than the amount of the fare, and provided the application for refund is supported by a certificate from a Government Land Agent stating the place from which the selector proceeded for the purpose of selecting.

8. The Railway Department grants a special concession in the way of fares and freights for a new selector's family and goods, on production of a certificate of *bona fides* from the Lands Department. Any selector of an area of not less than 500 acres first-class land may obtain from the Lands Department an order for railway tickets and freight for his family, goods, and chattels, from the station nearest his present or late residence to the station nearest the land selected, the amount to be repaid to the Department by the selector by bills at 12 and 24 months, with 5 per cent. interest added; until the bills are paid the land cannot be transferred or mortgaged except to the Agricultural Bank.

9. Any new selector residing on his land can arrange passages for his wife and family to this State through the Colonial Secretary's Department.

10. Agencies are established at Menzies, Coolgardie, Kalgoorlie, Southern Cross, Cue, Northampton, Geraldton, York, Northam, Beverley, Newcastle-Bunbury, Katanning, Albany, Bridgetown, Busselton, Narrogin, Wagin, Pingelly.

R. CECIL CLIFTON,
Under Secretary for Lands.
Perth, Western Australia.



**Yields
More
Milk.**

Mr. G. S. THOMPSON, Government Dairy Instructor made experiments in the hand-feeding of cows for milk and butter production, and in his report states that the yield of milk was greater from rations containing Sunlight Oil Cake than from rations in which Sunlight Oil Cake was not used. Mr. Thompson also proves that there is a decided fall in the quality of the milk from rations without Sunlight Oil Cake. Note the name "Sunlight" is branded on every cake.



**WE SEND THIS BOOKLET
FREE.**

To every Fruit Grower, who wants to increase his profits 25 to 30 per cent. by ridding his orchards of the insect pests that damage them and decrease the crops. The demand for this book has been very great, showing its practical value.

Swift's Arsenate of Lead

destroys all leaf-eating insects, of every kind, without burning or scorching the foliage, no matter how strong a solution is used.

It is not readily washed off, and therefore requires fewer applications than any other spray—less labor, smaller expense, larger crops, greater profits. Used and recommended by leading fruit-growers, orchardists and shade-tree owners everywhere.

It is White. It Sticks to Foliage. Can't Burn or Scorch.

F. H. FAULDING & CO., 341 Murray St., PERTH.

*It will pay you
to send for this book.*

AGRICULTURAL BANK.

Advice to Applicants



Intending clients of the Bank are requested to note the following directions, particularly with

regard to anticipating their requirements. By so doing much of the inconvenience from delays, which are at present unavoidable, may be obviated:—

DON'T DEFER making application until you are in financial difficulties. With ordinary foresight you should be able to anticipate your requirements by at least two or three months. If you are in any doubt as to being able to tide over the unproductive stages of development, put in an application before you start your improvements. If the request is a reasonable one you can confidently look for assistance, and, in the event of approval, the proposed work effected since date of application is paid for. It should be clearly borne in mind that the Bank does not pay against work done prior to that date.

As soon as you have lodged an application, see that the Leases or Occupation Certificate, as the case may be, of the security offered are in your possession, and ready for production when required. If these have not been issued you should apply at once to the Under Secretary for Lands.

Notices of Approval are not sufficient for the purpose of a mortgage.

No moneys can be paid over until a mortgage over the security offered has been completed. This is prepared free of charge and forwarded for signature as soon as an application has been approved in Executive Council, provided the security has in the meantime been completed, and a registration fee of 5s. paid on each Conditional Purchase or Homestead Farm block, with stamp duty of 2s. 6d. for each £50 of the amount of mortgage.

For further directions see page viii.

May be you like Saving Money?

IF SO,

I can Help.

I have just received a portion of my Melbourne-made Stock, which was delayed.

It comprises—

Ladies' real Chrome Glace Kid Oxford Shoes.

Ladies' real Chrome Glace Kid Button Shoes.

Ladies' real Chrome Glace Kid Lace Boots.

Ladies' real Chrome Glace Kid Button Boots.

NOTE that little word KID; it does not mean the skin of the giddy baa lamb, but KID, good tough KID, with a glace surface, and it wears well with 2 big W's.

Don't forget EZYWALKIN'S Melbourne-made Goods are genuine, and are building his trade.

Also to hand—

Melbourne-made Men's Boots in Tan and Black from 8s. 11d. to 16s. 6d.

EZYWALKIN'S GREAT SPECIALTIES.

Melbourne-made Boots and Shoes sound, durable, and neat. Boots and Shoes that can look at a bale of brown paper and know they are NOT related.

See here 2 lines—

Ladies' Glace Kid Ada Shoes, elysium for tired feet, 8s. 11d.

Ladies' Glace Kid Oxford Shoes, 6s. 6d.

Both made of Chrome Glace.

SPECIAL FOR THIS MONTH.

Men's No. 86 Tan Willow Calf Balmoral, welted, with round toe, 12s. 6d.

Truly

EZYWALKIN

Is a Friend to the Pockets.

Avoid the High Tariff and wear

EZYWALKIN'S MELBOURNE-MADE BOOTS & SHOES.

You will never regret it.

F. E. Randell & Co.

Produce Merchants,

338 WELLINGTON STREET, PERTH.

PRIME CHAFF, WHEAT, BRAN,
POLLARD, OATS, ETC., ALWAYS
ON HAND.

Sole Agents for . . .

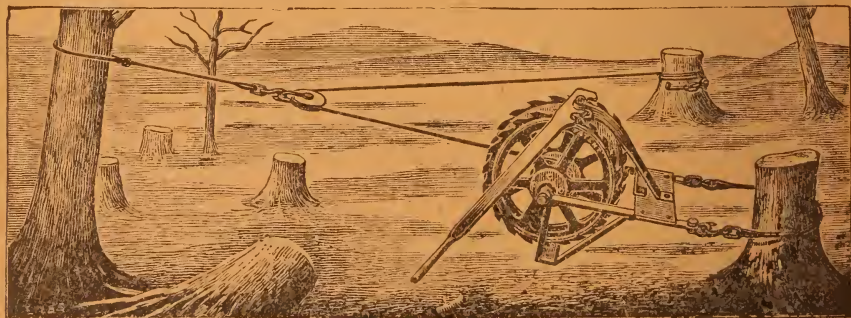
Seccombe's Famous Hand-shaken Paspalum Seed.



FARMERS, ORDER EARLY TO AVOID DISAPPOINTMENT.

"BUNYIP" TREE PULLER

SIMPLE. EFFECTIVE. PORTABLE.



Complete with Cables, Block, Lever, and Extension Lever.
Price, £20.

GEO. P. HARRIS, SCARFE & CO., LTD.,
MURRAY STREET, PERTH.

Stock, etc., for Sale.

NARROGIN STATE FARM.

- 10 2-TOOTH LINCOLN RAMS (our own breeding). Very nice lot for breeding and quality. From 3 to 4 guineas each.
- 14 LINCOLN RAMS, 4 and 6-TOOTH (imported from Eastern States). In different lots. 2 to 3 guineas each.
- 6 SHROPSHIRE RAMS, 2-TOOTH (our own breeding.)
- 6 2-TOOTH SHROPSHIRE RAMS at 3 Guineas.
- 2 2-TOOTH LINCOLN RAMS at 3 Guineas.
- 4 4-TOOTH LINCOLN RAMS at $2\frac{1}{2}$ Guineas.
- 2 6-TOOTH MERINO RAMS at 3 Guineas.
- 18 2-TOOTH MERINO RAMS at 4 Guineas.

Following Seeds :— LINSEED FLAX, INDIAN GRAM, PHALARIS COMMUTATA, AND OTHERS.

SEED WHEAT. MALTING BARLEY.

- 3 DEXTER-KERRY BULLS. 4 ANGORA BUCKS (2-TOOTH).
BERKSHIRE PIGS—YOUNG BOARS AND SOWS.
M. YORKSHIRE PIGS—YOUNG BOARS AND SOWS.

POULTRY—

WHITE LEGHORNS
BROWN LEGHORNS
PLYMOUTH ROCKS

BUFF ORPINGTONS
MINORCAS
SILVER WYANDOTTES.

PEKIN AND INDIAN RUNNER DUCKS.

TOULOUSE GEESE. TURKEYS.

For particulars apply to the Manager,
R. C. BAIRD.

BRUNSWICK STATE FARM.

FIVE YOUNG BERKSHIRE BOARS, 12 weeks old, by "Ringleader," out of pedigree sows.

Apply to Manager.

Journal of the Department of Agriculture.



Issued Monthly.

SCALE OF CHARGES FOR ADVERTISEMENTS.

						£	s.	d
Full page, per single issue	...	...	...	...	...	2	0	0
" " 6 months' contract	...	...	...	...	...	10	4	0
" " 12 " "	...	...	...	...	...	18	0	0
Half page, per single issue	...	...	...	...	...	1	5	0
" " 6 months' contract	...	...	...	...	...	6	15	0
" " 12 " "	...	...	...	...	...	12	15	0
Quarter page, per single issue	...	...	...	...	...	0	15	0
" " 6 months' contract	...	...	...	...	...	4	5	6
" " 12 " "	...	...	...	...	...	8	6	6

The following discounts will be allowed in cases where advertisements are paid for in advance:—

$7\frac{1}{2}$	per cent. discount when paid 12 months in advance.
5	" " 6 "
$2\frac{1}{2}$	" " 3 "

TENT, WATERBAGS, . .

. . TARPAULIN, . .

FLAG MANUFACTURER.

TRADE SUPPLIED AT LOWEST RATES.

Flags, Tents, and Marquees for Hire.

J. H. Graham,

69 Lindsay St.

(Late of Barrack St.),

Telephone 857.

PERTH.

STEEL WINGS

Patented
throughout
the World.



Some Exclusive Features.

DOUBLE CRANKS,
DOUBLE SPOKES,
DOUBLE
BEARINGS,
DOUBLE POWER,
EVERLASTING
LIFE.

Send for

Steel Wings Pamphlet.

Made in Western
Australia
and Sold with a
Guarantee.

The Bullock Electric Mfg. Co.,

859 and 861
HAY STREET.

1925
GEORGE WILLS & Co.,

MURRAY STREET,
PERTH,



Have supplied
more than half
State's require-
ments for the
past 10 years.

—
Quality as high,
Price as Low
as ever. - -

—
DEERING
MACHINERY
AND
PRODUCE
AGENTS.

Chaff and Grain Auctioneers.

Head Office : FREMANTLE.

BRANCHES at PERTH,
NORTHAM, KALGOORLIE,
YORK & GOOMALLING.

The LARGEST CHAFF
AUCTIONEERS in the State

Promptest
Settlements !
Highest
Prices !

H. J. Wignmore & Company,
LIMITED

SOLE
AGENTS

... FOR ...
CUMING, SMITH,
& CO.'S PROP., LTD.,
HIGH-GRADE

"Sickle" Brand Manures.

FLORIDA SUPERPHOSPHATE
(Runs Freely through any Drill).

Also Dissolved Bones Super, Nitrogenous Super,
Bonedust & Super Mixed, Bonedust, Bone Meal, etc.

BRAN BAGS, CORN SACKS, and all farmers' requisites
always on hand.

Sole Agents for WM. THOMAS & Co., Millers,
NORTHAM AND PINGELLY.

When visiting Perth,
we recommend . . .

THE SHAFTESBURY HOTEL,

Noted for comfort and moderate charges.

in Stirling
Street.

Write or wire.

WEA
cop. 1

PRICE 6^d

Journal of the Department of Agriculture



WESTERN AUSTRALIA

MARCH.

1909.

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Registered at the General Post Office for transmission by Post as a Newspaper.

Notice to
Farmers . .

We are buyers
— of —
Prime Quality

Wheat

— At —
Highest Prices.



Notice to
Storekeepers
Bakers, etc.

We are sellers
— of —
High Class .

Flour

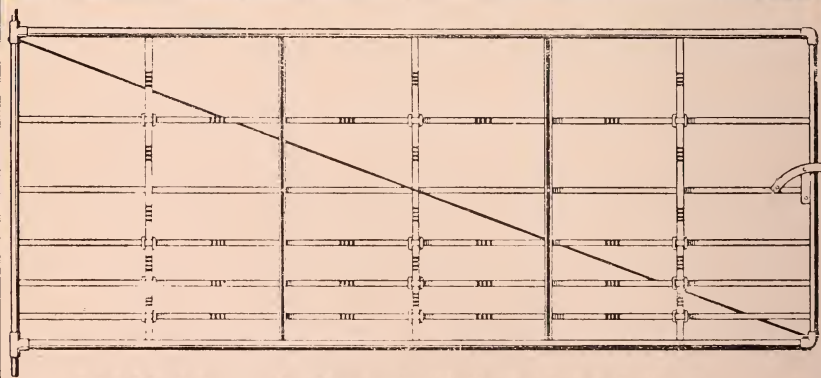
— At —
Lowest Prices.

COMMUNICATE WITH

WESTRALIAN UNION FLOUR MILLING Co., Ltd., Fremantle

THE
"PURSER"
PATENT.
THE LATEST THING IN GATES.

Made in various
styles suitable for
Farm, Station, or
Residence.



This Gate is as light on the Hanging and as cheap as a Wire Gate, with the strength and substantial appearance of a Bar Gate, made in any size and with any number of bars desired. Supplied complete, hangers and self-closing catch, with provision for padlock.

SEND FOR PRICES AND PARTICULARS—
Patentees and Manufacturers—

RICHARD PURSER & CO.,
King Street, Perth.

PEERLESS ROLLER FLOUR,

Highest Perfection Obtainable.

**SECURED FIRST AWARD ROYAL SHOW, 1908,
AND SWAN SHOW.**

Would recommend buyers
to ask for Peerless brand
to ensure the best.

Buyer of Farm Produce,
General Merchant and
Importer.

Lowest Quotations for Chaff Bags and Corn Sacks.

WM. PADBURY,
Guildford.

STEWARTS AND

LLOYDS, LTD.,

Makers of . . .

W.I. Tubes and Fittings

(For Wind-mills, Irrigation
Work, etc.),

Valves,

Steel Plates,

Boiler Tubes.



NOTE.—We have the
largest stock of Tubes and
Fittings in Australia,

SELL DIRECT TO THE CONSUMERS.

Small Orders and Large Orders receive
prompt attention.

Inquiries quickly answered.

West Australian Offices and Stores:

PERTH, FREMANTLE, KALGOORLIE,

Surrey Chambers.

Lord Street.

Boulder Road.

TILLY'S MOSQUITO AND FLY BANE

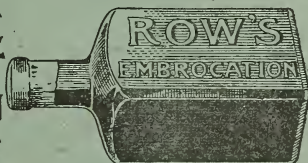
(Is. Posted, Is. Id.).

Effectually wards off the attack of

Mosquitoes, Flies, and Insect Pests.

TILLY, Chemist, 728 Hay Street.

SEE
THAT
YOU
GET



Dear Sirs We have used
ROW'S EMBROCATION for the last
30 years and have found it one of
the most useful remedies for horses.

If this is any use in securing
sales you are welcome to it.

Yours sincerely,

FITZGERALD BROS. CIRCUS PROPRIETORS

EDW^d ROW & CO. SYDNEY.
— SOLE MAKERS. —

*Settlers and Others who contemplate building will study their own
Interest best by securing*

LYSAGHT'S "ORB" OR "REDCLIFFE" GALVANISED IRON

OF ENDURING BRITISH MANUFACTURE,

For ROOFING PURPOSES, as those brands have been tested on the World's Markets
for nearly 40 years, and have given UNIV^{ER}SAL SATISFACTION to users
both for ECONOMICAL reasons and perfect RELIABILITY as to
general uniform EXCELLENCE of Manufacture.

"QUEEN'S HEAD" FLAT IRON ranks first for making up purposes.

SPECIAL LARGE HEAVY SHEETS FOR TANKS AND VATS.

OBTAINABLE FROM IRON AND TIMBER MERCHANTS THROUGHOUT THE STATE.

YORKSHIRE INSURANCE COMPANY, . LIMITED. .

ESTABLISHED 1824.

Authorised Capital - £1,000,000.
Reserves exceed - - £2,000,000.

Head Office - - - YORK, ENGLAND.

CHIEF OFFICE FOR WESTERN AUSTRALIA :

McNeil Chambers, Barrack-st., Perth.



DEPARTMENTS :

FIRE. LIFE. ACCIDENT.
EMPLOYERS' LIABILITY.
BURGLARY.
LIVE STOCK INSURANCE.

*Transit Risks by Sea and Rail
promptly arranged.*



LIVE STOCK DEPARTMENT:

HORSES AND CATTLE.

All risks of mortality, including destruction in the interests of humanity.

STALLIONS.—For season or twelve months.

IN-FOAL MARES.—For short periods or twelve months.

FOALS.—Against risk of being born dead or dying after birth.

PEDIGREE BULLS.—For short or long periods.

PEDIGREE COWS (including calving risks).—For thirty days or twelve months.

BLOOD STOCK.—Including risks of racing.

HUNTERS.—Special scheme, including depreciation.

MASSEY-HARRIS

CULTIVATORS, PLOWS, HARROWS,

GRAIN AND FERTILISER DRILLS,

CONSTITUTE A FULL LINE OF

**High-grade Tillage and Seeding
Implements and Machines.**

Agents at all centres, who carry stocks of extra parts for
ALL MASSEY-HARRIS MACHINES.

Western Australian Headquarters :

730 WELLINGTON STREET, PERTH.

F. H. Faulding & Co

WHOLESALE DRUGGISTS and
MANUFACTURING CHEMISTS

Best House in W.A. for ...



BLUESTONE

(English), Guaranteed Strength.

SULPHUR, PARIS GREEN

SULPHATE OF AMMONIA

SEAMING TWINE

VETERINARY INSTRUMENTS & REMEDIES

BORDEAUX MIXTURE

(Dry powder containing 55 to 60 per cent. Sulphate of Copper) for Mildew, Black Rot, etc.

GREEN SULPHUR

(More efficacious than ordinary Sulphur) destroys Caterpillars, Snails, and other Parasites of Agriculture.

Agents for ...

SWIFT'S ARSENATE OF LEAD, packed in suitable containers from 1lb. to lewt.

SINGER'S EGG PRODUCER.

**Correspondence
Invited**

WELDARINE.

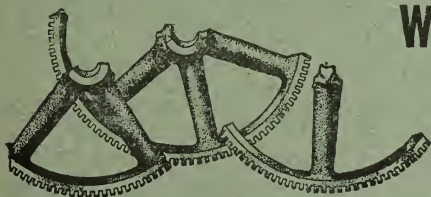
INSURE AGAINST SERIOUS LOSS THROUGH A BREAKDOWN!

Everybody who uses Tools or Machinery has something broken occasionally.

The Farmer in the midst of his harvest, loses a part of his crop because he has to wait for repairs.

The Manufacturer loses hundreds of pounds, while machinery lies idle, for a part that costs only a few shillings to repair.

WELDARINE IS QUITE EASY TO USE. EVERY SET IS COMPLETE.



Before Welding.

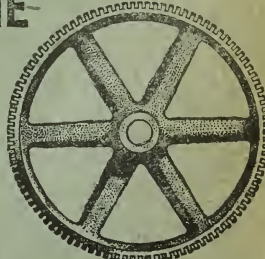
WELDARINE

IS
**GUARANTEED
TO WELD
CAST-IRON.**

Large Set,
complete, 25/-
by post, 26/6

Small Set,
complete, 15/-
by post, 16/3

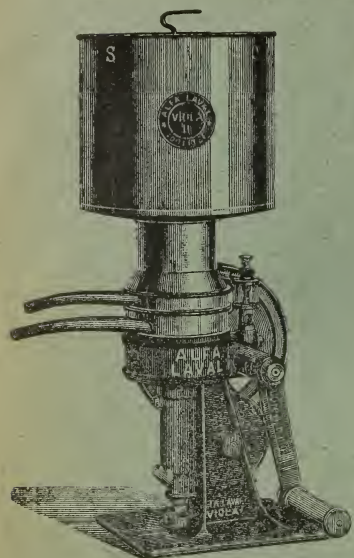
Full instructions
with every set.



After Welding.

STOCKED BY ALL STOREKEEPERS.

JOHN J. HORROCKS & Co., Ltd., PRINCES' BUILDINGS,
PERTH, W.A.



**YOU - ARE LOSING -
MONEY**

BY NOT USING THE NEW IMPROVED

**SPLIT
WING**

ALFA-LAVAL
SEPARATOR.

HOLDS THE WORLD'S RECORDS FOR 

**EASY RUNNING
CLEAN SKIMMING
DURABILITY.**

WRITE FOR CATALOGUE
TO SOLE AGENTS:

- - GARDNER BROS.

**LAWRENCE-KENNEDY MILKING MACHINES.
TAYLOR'S CALF FOOD. MOLASSINE. OIL CAKE.**

MOUNT LYELL SUPERPHOSPHATES

HAVE PROVED BEST BY TEST. FARMERS BELIEVE THIS.

They are again placing Orders for Coming Season.

BEST BECAUSE: HIGH ANALYSIS, FREE RUNNING, FULL WEIGHT IS GUARANTEED.

REGULAR SHIPMENTS ARRIVING WEEKLY.

SEEDS THAT SUCCEED.

SEND FOR NEW SEASON'S PRICE LIST OF GRADED

**WHEAT, OATS, BARLEY, RYE, PEAS, VETCHES, RAPE,
VEGETABLE, and GRASS SEEDS.**

Sole Agents:

NEW "ROBINSON COGLESS" DRILLS.

"KING" STUMP-JUMP DISC PLOWS. "ZEPHYR" STUMP-JUMP PLOWS.

"SUPERIOR" DRILLS. DISC HARROWS.

"PLANET, JR." IMPLEMENTS. CHAFF-CUTTERS.

HORSE WORKS. SCOOPS.

GARDNER BROS.,

609 Wellington Street, Perth,

AND AT FREMANTLE AND MELBOURNE.

Elder, Shenton, & Co.,

LIMITED,

Head Office : PERTH.

BRANCHES AT

FREMANTLE, NORTHAM, BEVERLEY, KALGOORLIE,
YORK.

STOCK AND STATION AGENTS, MERCHANTS AND SHIPPING AGENTS.


MERCHANDISE
ON
SALE.


English Superphosphates.

Thomas' Phosphates, Bone-dust, and Guano.

Waite's Special non-stretching Fencing Wire.

Fencing Wire, black and galvanised.

Wire Netting, Barb Wire, Galvanised Iron.

Bran Bags, Cornsacks, Woolpacks.

Regular WEEKLY STOCK MARKETS

held as below :


STOCK
DEPARTMENT.


York—1st Tuesday in each month.

Northam—2nd Tuesday in each month.

Beverley—3rd Tuesday in each month.

Northam—4th Tuesday in each month.

Midland Junction—Alternate Thursdays.

Competent Salesmen.

Cash Settlements.

Sales for the six months ending June 30 have been over 69,000 sheep, 720 Cattle and Horses, and 4,500 pigs. These markets are attended regularly by metropolitan and goldfields buyers.

Special sales conducted by arrangement.

WOOL AND Shipped to England on client's account.
FAT LAMBS Advances made against consignments.

AGRICULTURAL BANK.

LOANS to FARMERS.

UNDER THE AGRICULTURAL BANK ACT, 1906

(which repeals all prior Acts),

Advances, not exceeding in the aggregate £500, are made to Farmers and Cultivators for the following purposes:—

- (a.) Purchase of Breeding Stock.
- (b.) Payment of existing liabilities where secured by registered mortgage.
- (c.) Effecting improvements on the security offered.

The maximum amount that may be advanced for the former purpose is £100, and advances for the purposes set forth in (a.) and (b.) are only made on the security of existing improvements.

The improvements recognised by the Act, and to effect which the Trustees are empowered to advance their fair estimated cost, are

Clearing, Ringbarking, Fencing, Draining, Wells, and Reservoirs.

Interest at the rate of 5 per cent. per annum is payable half-yearly, and all Loans to effect improvements have a currency of 30 years, but may be repaid earlier at the option of the borrower.

Applications should be made on the Bank's forms, and forwarded, with a fee of 1 per cent. (exchange to be added to country cheques), to the Managing Trustee, from whom forms and full particulars may be obtained.

FEES FOR ANALYTICAL WORK.

The Hon. the Minister for Lands has approved of the following Scales of Fees:—

For general public and vendors of fertilisers and feeding stuffs—Scale I.

For *bonâ fide* farmers and gardeners—Scale II.

	Scale I.	Scale II.
FERTILISERS AND FEEDING STUFFS—	£ s. d.	£ s. d.
Estimation of Nitrogen	0 10 0	0 5 0
" Potash	0 10 0	0 5 0
" Water soluble phosphates	0 10 0	0 5 0
" Citrate	0 10 0	0 5 0
" Insoluble phosphates	0 10 0	0 5 0
" Lime... ..	0 10 0	0 5 0
" Sulphate	0 10 0	0 5 0
Complete analysis	1 10 0	0 15 0
Albuminoids	0 10 0	0 5 0
Oil	0 10 0	0 5 0
Fibre	0 10 0	0 5 0
WATER—		
For irrigation	1 0 0	0 5 0
Complete analysis	3 0 0	1 0 0
SOILS—		
For each soil	2 0 0	1 0 0
For soil and sub-soil submitted together	3 0 0	1 10 0

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Mangolds, Swede
Rape, Lucerne
etc., etc.

ROSSITER & Co.

When writing mention this Journal.

655

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Seed and Roots.
Paspalum Distichum (Water Couch)
Roots for Swampy Lands.

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Frozen Meat Wraps

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New Zealand.

AND ALL OTHER KINDS
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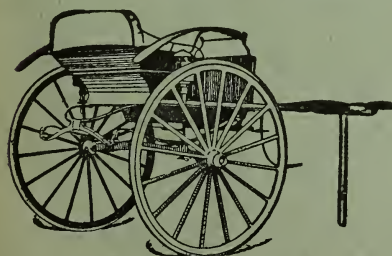
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THIS is a Boarding and Day College. The attendance, at present, numbers 86 Resident Boarders and 106 Day Scholars.

The Students are always under supervision. The Boarders are not allowed to leave the precincts of the College without special permission.

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Examination Results.

University Primary or Preliminary...	94	Passes
University Junior ...	114	"
University Senior ...	52	"
University Higher ...	40	"
University Honours ...	191	"
First Place in South and West Australia ...	9	Times
Second Place in South and West Australia ...	8	"
Third Place in South and West Australia ...	4	"

Money Prizes won by the Students.

19 University Prizes amounting to ...	£	s.	d.
26 Government Exhibitions of £15 each ...	294	3	4
14 Government Exhibitions of £25 each ...	310	0	0
5 University Exhibitions of £450 each ...	2,250	0	0
1 University Exhibition of £225 ...	225	0	0
2 Rhodes Scholarships (£900 each) ...	1,800	0	0
	£5,229	3	4

NOTE SPECIALLY that boys of all Denominations are admitted to the College. The religious opinions of every Student are scrupulously respected.

I writing for Prospectus kindly mention this Journal.

Neptune Unrivalled Patent Steel Wire

Makes Cheapest, Strongest, and Most Satisfactory Fence.

The only Wire that is Non-stretching.

Note Comparison of Cost:

	Breaking Strain.	Length per cwt.	Cost per ton. Fremantle.	Cost per mile one wire. Fremantle. Wagin.
"NEPTUNE UNRIVALLED," 12 $\frac{1}{2}$ g. ...	1140lb. ...	1430yd. ...	£19 ...	23/5 ... 26/
ORDINARY GALVANISED WIRE, 8g. ...	1125lb. ...	528yd. ...	£10 ...	33/4 ... 40/8
"NEPTUNE UNRIVALLED," 14g. ...	730lb. ...	2240yd. ...	£20 ...	15 4 ... 17/7
ORDINARY GALVANISED, 1g. ...	720lb. ...	816yd. ...	£10/10 ...	22/8 ... 27/9

7 cwt. 12 $\frac{1}{2}$ does as much fencing as 20 cwt. No. 8 ordinary wire.

4 $\frac{1}{2}$ cwt. 14g. does as much fencing as 13 cwt. No. 10 ordinary wire.

THERE are imitations of "Neptune Unrivalled" on the market which are claimed to be "just as good." "Neptune Unrivalled" is the **only** wire that bears the manufacturer's guarantee of Breaking Strain and Length per cwt. Look for Brass Disc on each coil showing these figures, and the words "Neptune Unrivalled." None other is genuine.

Neptune Unrivalled Wire has stood the TEST of Years.

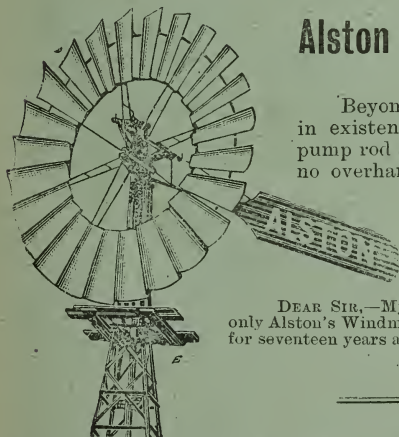
IGEL BARB WIRE.—1 cwt. contains 40 $\frac{1}{2}$ chains. Cheapest per mile. This wire was used on Rabbit-proof Fence throughout.

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DEAR SIR,—My Manager on the Murchison Station requests that only Alston's Windmills be sent him, as he has one that has been in use for seventeen years and is as good as ever.

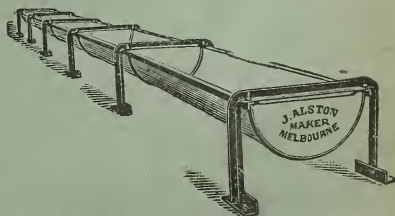
Yours, etc.,

(Signed) A. DEMPSTER, Muresk.

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The Best Trough ever invented.
Will not crack, leak, rot, or rust.

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◎ YOU HAVE NOT A HOPE ◎

of obtaining any fat at all from the milk after it has passed through the separator—it's greedy, and takes the lot.

We have a book which illustrates and tells you all about this Separator, and may be had for the asking.

It will mean more profit for you.

WM. SANDOVER & CO.,



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Dairy Requisite Specialists,

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JOURNAL

OF THE

DEPARTMENT OF AGRICULTURE

OF

WESTERN AUSTRALIA.

By Direction of

The HON. THE MINISTER OF AGRICULTURE.

PUBLISHED MONTHLY.

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**MARCH, 1909.**  
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PERTH:

BY AUTHORITY: FRED. WM. SIMPSON, GOVERNMENT PRINTER.

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1909.

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The best possible Value for Money	“
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Perth, Fremantle, Kalgoorlie, Northam.

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JOURNAL
OF THE
Department of Agriculture
OF
WESTERN AUSTRALIA.

Vol. XVIII.

MARCH, 1909.

Part 3.

NOTES.

India's Wheat Crop.—Prospects for the coming Indian wheat crop are said to be encouraging. It is anticipated by the end of March that India will be exporting wheat to Europe.

Mr. Wicken's Return.—Mr. Percy G. Wicken, Field Officer, who had charge of the Western Australian Court at the Franco-British Exhibition, returned to Perth by the R.M.S. Malwa on the 2nd instant, and has resumed his old duties.

British Food Imports.—The total value of the principal articles of food imported into the United Kingdom in 1908 was £183,699,000, as against £188,353,000 in 1907 and £181,604,000 in 1906, and an average of £177,047,000 in the three years 1903-1905.

Cotton-growing in Uganda.—The development of the cotton-growing industry in the British Protectorate of Uganda, East Africa, is making great progress. In 1906 800 bales of lint of 400lbs. each were shipped to England, and in 1907 the shipments amounted to 3,000 bales. The cultivations are in the highlands, and consist of the Upland varieties.

Australian Fruit for Switzerland.—The Agent-General states that the Swiss Department of Agriculture has decided to limit the importation of Australian fruit into the Republic to shipments authorised through the Customs at Basle, where the fruit must be inspected by an expert and will only be passed if found to be free from San Jose scale, and all other parasites.

National Show, Busselton.—Mr. F. H. Layton, Secretary of the South-West Central Agricultural and Horticultural Society was mentioned in the February *Journal* as being the Secretary of the National Show held at Bussel-

ton in January. Mr. Layton writes to correct this, and to say that the honour on that occasion was due to Mr. A. R. Bovell, Secretary of the Southern Districts Agricultural and Pastoral Society.

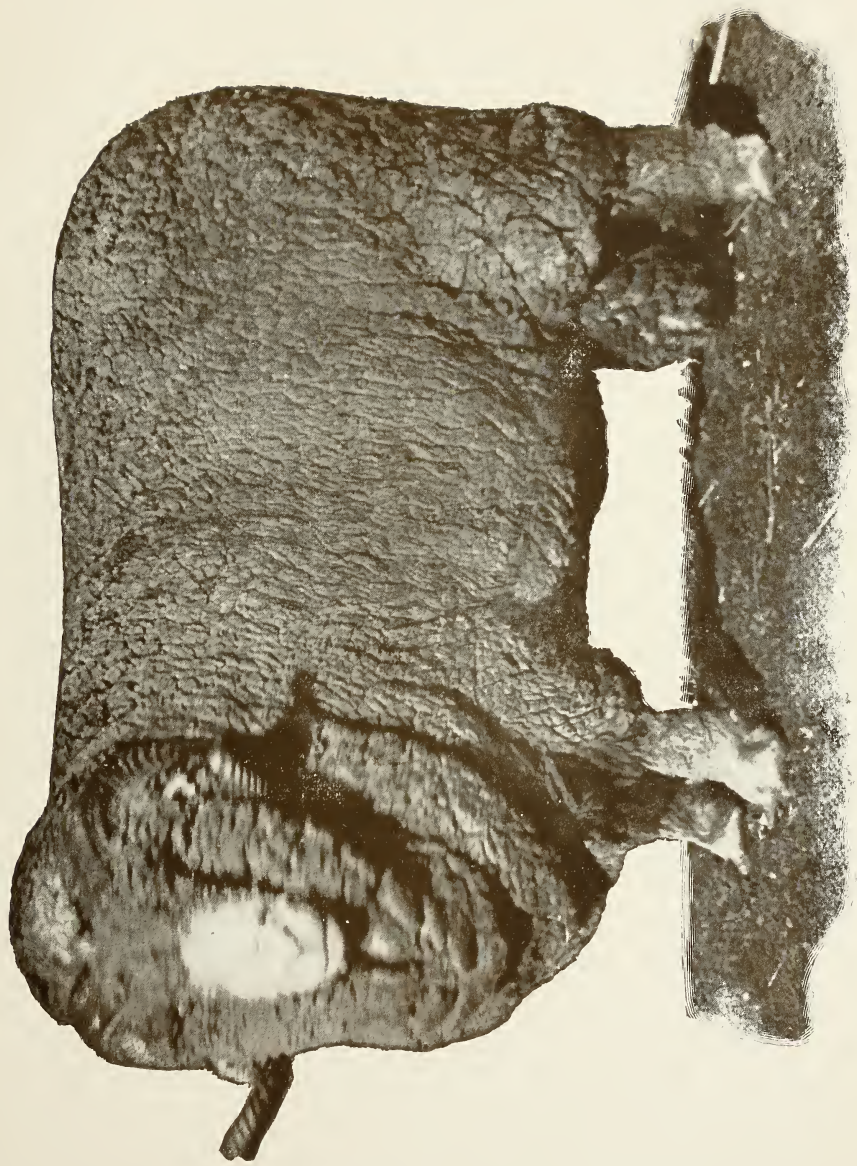
White Ants Extermination.—White ants are proving such a pest in the Federated Malay States that the States Government and the Malay Planters' Association have joined to offer a reward of £5,000 to any person who can devise a simple method of extermination. It has also been arranged that the Government Entomologist shall give special attention for several years to the subject of white ants and various methods for their destruction.

The Value of Mules.—The representative of a large pastoral concern in New South Wales states that it is intended to replace horses on their stations with mules as soon as possible. In explanation he said that, for one thing, out of twenty horses they might get three good enough for mustering work; out of twenty mules they will get twenty good ones. A mule will work any horse off its legs. Mules are the right animals for station work and experience proved the wisdom of replacing horses just as fast as they can get enough mules.

Cattle Warranty.—At the annual meeting of the Cheshire Milk Producers' Association held at Crewe, England, a suggestion was made that there should be a payment of three shillings per head on all cows and heifers in milk and in calf, and two shillings per head on all bullocks and heifers over two years old, to be indemnified at £15 per head; for those taken out over one year and under two, the premium to be one shilling per head with a £7 10s. indemnity; over six months and under one year the premium to be sixpence per head with a £3 15s. indemnity. This scheme referred to bovine tuberculosis, and it was thought that in about five years the disease would practically have disappeared if all the diseased animals were carefully weeded out.

Royal Agricultural Society of W.A.—The Autumn Show of the Royal Agricultural Society of Western Australia will be held in the Exhibition Building, Hay Street, on Wednesday and Thursday, 24th and 25th inst. The question of holding an annual show of this kind has occupied the Society's attention since the 1900 Show in Queen's Hall, and it has taken the present definite shape through the liberal assurance of support given by fruit-growers. There is unquestionably an abundance of prime fruit products in this State worthy of public exhibition and there should be a display on this occasion that will reflect the highest credit. It is intended to construct great trophies of apples, grapes, etc., as well as of wheat and other cereals. The prize lists of the several classes are framed on generous lines.

A Simple Test for Lime in Soil.—Take a few shovelfuls of soil from different parts of the field or orchard and dry, pulverise, and mix them thoroughly together. Take a few ounces of this, powder and reduce to ashes on an iron shovel over a fire. Put these ashes when cool into a glass tumbler and mix with them as much water as it will take to cover them. Stir this with a glass rod or wooden stick, but not with anything metallic. To this paste add an ounce of hydrochloric acid, which is commonly sold as muriatic



"Burns" (sire, "Jason"), Champion Ram, Adelaide, 1908. Bred by and the property of C. E. and J. L. Stirling, Nalpa, S.A. Dipped in Quibell's Dip.

acid, or spirits of salts, the mixture being stirred all the time. If a fairly brisk effervescence takes place, it may be taken for granted that the soil contains a fair percentage of lime, but if little or no effervescence takes place the soil contains little or no lime.—Bulletin No. 6, Department of Agriculture, Tasmania.

Decrease of American Phosphatic Supplies.—The phosphate rock of South Carolina is nearly exhausted and the Florida deposits, once popularly considered practically inexhaustible, have reached their maximum production. They will soon begin to decline. Tennessee has comparatively large deposits, but this field alone would at the present rapid rate of increase of production last only eleven years, according to the Government geologists. There is some phosphate rock in Arkansas, but it is of low grade. The large deposits, therefore, of the public land in the States must furnish the most of the phosphate of the future, and to insure the enrichment of their own soil from native phosphate beds it is considered necessary to devise methods to prevent the profitable business of exportation.

A Notable South Australian Flock—"Nalpa."—One of the finest flocks of Merino sheep in Australia to-day is that owned by Messrs. E. C. and J. L. Stirling, of Nalpa, Langhorn's Creek, South Australia. This statement is amply verified by the fact that at the last Adelaide Show they annexed the leading honours in competition with the most noted flocks in the Southern State. Mr. Arthur A. Fullarton, Manager of Nalpa, is an expert, and it is surely more than a mere coincidence that he, like so many of the world's most up-to-date sheep men, is enthusiastic in his praise of the merits of Quibell's Sheep Dip as an improver of the growing fleece. Writing to Messrs. Dalgely & Company, Ltd., of Adelaide, under date 13th October, 1908, he states:—"Will you please send at once to Strathalbyn, addressed to Mr. W. Moore, two 5-gal. Drums Quibell's Liquid Sheep Dip, and powder dip enough for 300 sheep. I may here add that I dipped all the sheep in Quibell's Dip last year, and was greatly pleased with the result of dipping. It rendered the wool bright and soft to handle with a nice 'tip.' My Show sheep were all dipped in Quibell's. I am satisfied that the dip is a good one."

How Weeds Spread.—An English exchange makes the following pertinent remarks on the spread of weeds:—"In the vicinity of towns it is common enough to see pieces of land waiting for the builder and in the meantime producing an abundance of useless and obnoxious vegetation. If these weeds confined themselves to the unoccupied areas it would not matter so much; but they do not, as the seeds are borne here and there on the wind to great distances very often, and are finally deposited on the fields of farmers, the plots of allotment holders and the gardens of householders and amateur horticulturists. The worst neighbour a cultivator can have is a man who does not keep down his weeds; but to give up the cultivation of land and let it stand, as acres of building land often do for years, to become a veritable nursery of weeds, is obviously unfair to farmers and gardeners round about. In the country, fortunately, one does not get so much of this kind of thing as in the vicinity of towns, but in a good many rural places there are weed nurseries in the shape of unoccupied pieces of land. It may be observed also that if a house becomes vacant it is the invariable custom on the part

of the landlord to let the garden go to waste, with the result that everybody round about gets a share of the weed seeds produced in it. One cannot help thinking that the policy of letting the surroundings of habitations go wild when unoccupied is a foolish one, as a garden overgrown with weeds is not the sort of thing to encourage a would-be tenant."

Analysis of Mill Offal.—In order to arrive at the comparative value of mill offal with wheaten chaff, a sample of the former from a local mill was submitted to the Government Analyst for analysis. Mr. Mann reports as follows:—

Moisture	..	..	..	..	1.00 per cent.
Ether Extract	..	..	..	..	2.36 per cent.
Albuminoids	..	..	..	..	11.47 per cent.
Fibre	..	..	..	..	13.70 per cent.
Ash	..	..	..	..	4.30 per cent.
Nitrogen free extract	..	..	..	..	67.17 per cent.
					100.00 per cent.

Unit value according to Dyer's scale, 100.36; wheat chaff (Henry, page 178), 25.22.

According to this, mill offal is four times as valuable as wheaten chaff, and can be purchased, besides, at a cheap rate.

THE MEXICAN POPPY.

(*Argemone Mexicana.*)

The illustration on the opposite page represents one of the noxious weeds of Australia, the *Argemone Mexicana*, or Mexican Poppy. It is also known as the Prickly Poppy and Devil's Fig. The plant is indigenous to Mexico. It is an erect annual of hardy growth, reaching a height of several feet. The leaves are of a whitish green, deeply incised and spinous; flowers large, yellowish white; seeds small and enclosed in a many-chambered capsule. It is a very objectionable weed. The seeds are more powerfully narcotic than opium.

This description is given to familiarise farmers and others with the appearance of a plant which threatens to become a serious pest. Specimens of the weed were lately seen growing in fallow land in the neighbourhood of Irishtown, near Northam.

Reference to plate.—A.: Capsule, open. B.: Ovary. C.: Showing how the stamens are arranged around the ovary. D.: Pitted seed. All variously magnified with the exception of the capsule.



THE AGRICULTURAL INDUSTRY.

(Address by PROF. W. LOWRIE, Director of Agriculture.)

At the invitation of the Northam Agricultural Society, Professor Wm. Lowrie, Director of Agriculture, delivered the following instructive address in the local Mechanics' Institute, on 6th inst., on the farming possibilities of this State. There was a large attendance, Mr. T. H. Wilding, President of the Society, in the chair.

In introducing Professor Lowrie, the chairman warmly commended the work he had done in South Australia and New Zealand, and expressed confidence that under his guidance agriculture in Western Australia, and particularly the fat lamb industry, would make rapid strides.

Professor Lowrie, who was accorded a very warm reception, said:—"When I received the invitation of your secretary to come up to one of your meetings and give a short address, I was very pleased to accept, not with the notion that I was prepared to take up work definitely in the way that I hope in the future, as I gather experience of the conditions, I shall be able to do, but that I might be present at your discussions and hear what was being done and what was the opinion of men working in this district, which I know to be one of the oldest settled and oldest farmed districts in the State.

Being new to local conditions I will as far as possible keep to ground that I know to be comparatively safe. I shall speak from the analogy of South Australian districts, which I think very closely resemble in climatic features, and indeed to some extent in soil, this particular district. You will understand that it will be on experience of those districts that I speak, and not on experience acquired in your midst. I have had some considerable opportunity during the few weeks I have been here of seeing from the railway train what little can be seen in that way of the agricultural development that is proceeding here, and I have been agreeably surprised to witness the extension and rapid forward movement that has occurred since many years ago I had the opportunity of going through this State. The area to anyone coming from New Zealand, as I have recently come, is, of course, immense, and without giving any opinion as to the ultimate fertility of the land, which I would not be justified in doing, I will say this, that, taking account of the very large areas that are possible of considerable development, I have no hesitation, and no one can have any hesitation, in saying there is a vast amount of agricultural wealth to be drawn out of Western Australia when the more inferior lands are left entirely alone, and only those that are capable of giving immediate returns are developed. The extent is so great that with the will and the increasing of the population to tackle the great work success is positively assured.

Dairying.

Now in this district of 15 to 18-inch rainfall it seems to me that when we mention the two items of general mixed farming—wheat and sheep, meaning sheep with a view to fat lambs—we have just mentioned the two forms

in which the energy of the rural settler here can be to the best advantage exercised. Dairying we sometimes hear urged, and I have no doubt we should all like to see it very greatly extended, but in a district like this the opportunity is not there compared with the opportunity there is to get the best and most profitable return out of the land with wheat and sheep worked consistently and skilfully together. Dairying is one of those industries which I have no doubt will be developed in Western Australia, but, as you know—farmers will know at any rate—that industry is to be developed in those districts which are fortunate, not in having better land, but in having a longer green grazing season, and in having a heavier rainfall and greater bottom moisture to carry forage crops, and also having, say, three to five per cent. or more—the more the better—of land capable of being irrigated so that with the ground that will carry forage crops in itself and the land that can be forced with the little bit of water available, there is an opportunity of having green forage for direct grazing or ensilage to keep the cows in full yield during the time when their product commands the highest price in the market. Therefore it will be in other districts than this for me in the course of my extension work to urge the claims of the great dairying industry. And I will just say this whilst speaking generally, that in the districts to which I have referred it will be found, as it has been found in Victoria and portions of New South Wales and New Zealand, that there is no part of farming proper that enables a man to take a greater amount of return out of the land than does dairying. It will be found in those better rainfall districts that the man with a family who wishes to seize his best opportunity for making money and whose family has the will to help him, will find that best opportunity in dairy farming. There may be other lines for the capitalist—such as apple growing—but for the man without much capital, dairying will offer the brightest opportunity.

Wheat and Sheep.

In this district it is my opinion that the best will be made out of these lands by a judicious practice of careful wheat growing and skilful sheep raising, and it is to these that I shall apply my remarks this afternoon. It is eighteen years since I was first urging this same policy on some of the farmers of South Australia, and was met with the retort, "Of what value is it to grow fat lambs when we may have to sell them at 3s., and shall be agreeably surprised if we get 7s.?" It was for me to point out that the excess they feared over the local demand for the time being was the most direct means of developing a trade that would relieve that stagnation and make the market such as it has since become. The fact that the lambs were there and could be picked up cheaply developed the freezing trade. In the early days of freezing in South Australia I well remember that one of the firms—I think it was Wills & Co.—made contracts with a few of the leading graziers to take all their lambs fit for freezing, 32lbs. to 36lbs., at 8s. or 9s. per head, and gave them a forward contract for two or three years. These graziers rubbed their hands and thought they were in a wonderfully fortunate position, but it turned out that before the period of those forward contracts expired lambs were selling in the open market at 12s. and 14s., and were being bought by freezers to ship to London. Thus you see when this industry begins to grow it develops very rapidly. You know what an immense development there has been in New Zealand. Many farmers have ceased to grow cereals except on limited areas, and have devoted their energies almost entirely to forage crops with a view to





BRUNSWICK STATE FARM.

1. View of the irrigated area. 100 tons of the growing maize.
2. Source of irrigation supply, Brunswick River. Sack dam and gauge.

fattening sheep, and find these forage crops more profitable, although their wheat crops averaged over 30 bushels to the acre.

Australia and New Zealand Compared.

I went to New Zealand with a keen desire to learn just what the Canterbury lamb was that always brought a penny or $\frac{3}{4}$ d. per pound more on the London market than Australian lamb, and to find out how it was produced. You may question my judgment on the matter, but I will say this, that in South Australia I was able to produce fat lambs as good as I did in the seven years I was working in New Zealand in one of the most favoured districts in that Dominion. If they were not better they were certainly earlier. In four and a-half months I could make a lamb in South Australia of a certain weight and quality that I could not make in New Zealand in the same period with rape and vetches and the best of fodder. The weather in Australia is warmer and drier. In New Zealand the lambs have their bellies and fleeces frequently wet and do not grow so rapidly. When I argued with my New Zealand friends on this matter and told them they could not beat the Australians if the Australians were as careful over their sheep, I instanced to them that I had fat lambs at the Adelaide show lambled at the beginning of May and killed on the 13th of September that dressed $64\frac{1}{4}$ lbs., butcher's weight, or equal to about 61 lbs. freezing weight. A lamb of that age and weight I could not reach all the years that I was in New Zealand. The South Australian lambs of which I speak were produced on stubble and fallow worked on the system of taking a crop once in three years, their feed being dandelion, wild oats in more than abundance, trefoil, etc. They were out of half-bred ewes, by Dorset Horn rams. If I were on Roseworthy again, with its 17-inch rainfall, I could go one better than I did then, consequent on what I learned from those keen sheep graziers of New Zealand.

Over-stocking.

To keep the industry as satisfactory as it should be the one fact that every farmer should keep before his mind's eye is, beware of over-stocking. That, of course, is an everyday platitude, but although the dangers of and the troubles from it are very well understood, there are many that do not act accordingly. I think every farmer should have it pasted up in red ink over his dressing table, so that he will see it every morning, "Beware of Over-stocking." Its evils come out in so many ways.. Your ewes suffer, your wool is tender, your percentage of lambs is smaller, and your lambs are never of good quality. Rather see some of your feed going to waste than run the risk of seeing your sheep scraping the surface for something to eat. Even to the very wisest and most cautious there comes a time when things will "gang agley." When that time comes I would urge that if there is a stack of hay on the farm, that stack shall be reduced before the ewes are allowed to suffer. Rather than pinch his flock when they are about to drop their lambs, it will pay a man to chaff his hay and feed it to them, even when hay is at so high a price as you are fortunate enough to receive for it here. One pound of chaff per day will keep them in fair condition, and 2 lbs. per day will be full going for them. You will not have to do it very long, and then only in exceptional seasons, when heavy summer rains come and the dry feed gets trampled down and blown away. If you have no facilities to chaff, feed the hay long. It

will be more wasteful than chaffing, but better than letting the flocks starve and have a break in the wool.

Triennial Crops.

The very practice that will enable the farmer to get the best return of wheat is just that practice that will get the most feed on his land. I know there is a considerable proportion of farmers in this district who do not let their land lie out for a year. Fallow and wheat is their practice. They are the judges of the conditions under which they are working, but my notions are that I would be able to do better, if I could weather it all, by taking a crop once in three years, and keeping sheep. I will endeavour to give you my reason for taking up this position. In the first place, fallow and wheat, fallow and wheat, in constant succession, works the organic matter out of the land. You are producing a crop, but you are exhausting the land, for as you exhaust the organic matter you are lessening its capacity to hold moisture and lessening its capacity for ferment or bacterial activity. Everybody knows that you cannot grow wheat in an ashpit. By working the organic matter out of the land, you may get it in that set condition that it will be firm enough, but the crops will suffer, because the moisture is not held there. I have no doubt it is the experience here as it used to be in South Australia, that no matter how carefully the farmers worked their land they could not get the crops they did in the early days. It was just because they had worked the latent organic matter out of it. For that reason, if for nothing else, I would argue for letting the land lie back in the third year, to grow such herbage as it will easily grow.

A Valuable Suggestion.

If in following this system you will dress your wheat with more phosphates than the demands of the wheat render necessary, you will get a reserve of phosphates that will increase the forage on the land in the year that is lying out in a way that will astonish you. The feed will also be of a greater fattening value. My neighbours and others recognised that they not only got more feed by having a reserve of phosphates in the ground, but that the feed was better and fattened the stock more quickly. To get these conditions I would dress more heavily with artificial manures than is the common practice here. Three-quarters to one cwt. per acre is sufficient to meet the demands of the crop, but not sufficient to put a reserve into the land. I have not had experience of your growing season and I do not know to what limit you can go before you find that excess of phosphates affects the filling of the crop. In South Australia on mallee land I could use up to 3cwt. without in any way prejudicing the filling of the wheat. I did use very extensively 2cwt. to the acre, and 3cwt. I put on now and again to see how far I could go. One year I got 22 bushels from 12.3-inch rainfall after using 2cwt. of superphosphates, so that with the average rainfall here it should be practicable to use 1½ to 2cwt. I merely throw this out as a suggestion. I have been long enough on the land not to speak dogmatically, but I will say that the practice is well worth trying. After a time you could reduce the quantity of phosphates, but you have to work up so as to get a reserve of phosphates in the land to encourage herbage such as the trefoils, which always follow phosphates, especially where there is sufficient limestone. Two years ago I saw a farm that I had previously worked and which my successor had continued on these



BRUNSWICK STATE FARM.

1. Irrigated maize, showing system of planting; green from top to bottom.
2. Irrigated maize, 88 days after planting; 13 feet high.

methods, and he got two tons of dry forage, almost all clover, from land cropped with wheat the year before, simply as the result of a generous application of phosphates. On that land when we cleared it you would have to look a long time before you found a single plant of clover. There was a little silver grass and spear grass, but no sign of the trefoils. With the manuring of the land these trefoils followed, and the sheep spread them, and most excellent fodder they made, even when dry, so long as there was water in the paddock.

Fertilising the Land.

The position I am advancing is this: If you wish to keep the best carrying capacity on your land for sheep be more generous with your manures than you would be if considering wheat alone. I am not saying that the extra half-hundredweight or hundred-weight of super will give you the same relative increase of wheat as what you now apply, but I say it is worth doing for a few times to get a reserve of phosphates in your land and to add to their feeding value. The question works itself out in another way. When you are following the system of wheat and fallow, wheat and fallow, you are not able to take the full value out of the manure you apply. In many instances you may find it well to give land an occasional dressing of ground quicklime when the plants will take the phosphates you are applying at considerable expense, with more advantage to the crops. It is a common saying that wheat is its own worst enemy. I know that wheat has been grown on one plot every year for sixty years, but the yield has gone down to eight bushels whilst properly treated land alongside has been yielding over forty. It is a fact that wheat will do better by having an alternation of vegetation.

Supply of Nitrogen.

Then again, and I think it is the most important part of all, in the days which will come if there is a sufficiency of phosphates there will be a big percentage of leguminous plants. These will be a source of enriching the land in nitrogen, and that is by no means to be neglected when sulphate of ammonia is worth £12 10s. or more per ton. Following the practice I have suggested you will be able to go on without any application of nitrogen at all and get good crops. You will scarcely be able to do that on the system of wheat and fallow alternately, and it is well to stop before you reach a degree of exhaustion that will cost you time and expense to recover. In South Australia, through soil exhaustion, they got down to four bushels, and the position became very serious. In New Zealand they stopped before they reached that stage of exhaustion. The freezing industry had set in and they found it profitable to grow forage crops. To those who are practising wheat and fallow I would say that it is worth your while to think whether you had not better adopt the three-year system now, rather than have the trouble to recover lost fertility and the chagrin of poor crops for a year or two whilst you are recovering. Nitrogen, as most of you are aware, comes from three sources. It comes from the breaking up of the organic matter which I have shown is increased by allowing the land to lie idle for a season. Then there are minute ferments or bacteria, which, working in close association with the roots of leguminous herbage, take the nitrogen from the air and fix it in the soil. I am perfectly sure that when a real out-and-out bacteriologist gets sitting down for a year or two on Australian soils he will find a ferment life of which his researches in Europe gave him very little conception indeed.

Benefits of Fallowing.

It is want of ferment life that checks the growth on unfallowed land, not entirely want of moisture, because even when there is an abundance of rain the fallowed land will always give the best result. Bacteriologists have demonstrated that in a cubic inch of soil there are millions of these minute ferments, bacteria, fungi, or whatever you like to call them. By careful subdivision and the aid of a powerful microscope, the number of bacteria in a square inch of soil has been estimated at eleven millions. That form of life is there and is working to the advantage of the farmer. When you fallow land well and get moisture in it it keeps the life in the land. I don't believe in the man who ploughs his land in the wet and then leaves it. That kind of fallowing loses half its life under similar conditions to those that affect higher organisms. They want air, moisture, and food. If you plough your land when it is wet and leave it undisturbed in the spring you get a sun-baked condition in which no ferment life can exist. I do not urge that you should be working your fallow in dry weather. That is mischievous, because it works the moisture out and gets the land too loose. Work it in the spring, when it is fit to work, then you will get ferment life most active, and you will get the best crops. By this three-year system, by increasing the organic matter and enabling these ferments to take the nitrogen out of the air you will be keeping your land good. A scientist named Nobbe proposed to introduce cultures of these ferments and to distribute them on the land, under the name of nitrugin. I do not think that there is any doubt that we have here just what he is after. By giving the wheat excessive phosphates, as I have recommended, you help these ferments, and this is one of the reasons why we in Australia find such beneficial results on wheat crops from the use of phosphates pure and simple. The phosphates also enable the crops to stand the winter frosts better and make the wheat fill better, but the most important point is that the grain will fill with two-thirds of the moisture that would otherwise be required to pass through the plant. In parts of Australia we have just got to the verge of profitable cultivation so far as the rainfall area goes. By judicious working we are enabled to get good results from a smaller rainfall than would be of any use without the employment of phosphates. The very method of working which will enable the land to produce the most wheat is the one which will enrich the land and grow the greatest quantity of fodder, and it is for that reason that in this climate and this district the growing of wheat and the raising of fat lambs should go hand in hand, and you will find that by such generous farming you will fatten very nearly as many lambs with one-third of your area in crop as could be fattened were the whole area devoted to grazing without cultivation.

Best Breeds of Sheep.

You may ask what breeds of sheep are best adapted for this purpose. Of course, in Australia the merino must always be the basis of the wealth we get from the sheep. At the same time, I think that farmers working under conditions such as I have been talking of will do better with half-bred or three-part bred ewes than with merinos. In that respect you are in a more difficult position than the farmer in New Zealand. There they can buy in the market two-tooth half-bred ewes all ready to put on the land. They can buy those ewes in lots of 200 to 700, according to their requirements, and after keeping them for three lots of lambs sell them again. These conditions, I

believe, do not exist here, although if the demand were here probably it would be met by the pastoralists. Failing that, my idea would be to get hold of a line of the biggest framed and best merino ewes, such as those from Bungaree, Boobarowie, Capeedee, Cauowie, or ewes of that type, bred by our own pastoralists in this State, and with these use a long-wool ram, Lincoln, English Leicester, or even Border Leicester, but always and every time a long-wool ram. I have gone through the other stage, using a short-wool ram, but it was want of experience that made me do it. The English Leicesters and the Border Leicesters are not plentiful, but they can be obtained almost as easily as the Lincolns. From experience I lean more to the English Leicester than to the Lincoln. The Lincolns may give you a greater weight in your lambs, but you will have a heavier loss in lambing, and by that means you may lose more than you gain. The pure-bred Lincoln is most delicate as a hogget, and the Lincoln crossbred as a hogget is not so early as the English Leicester. If you are going to sell all your lambs and simply buy ewes off the shears and run a sort of lamb and dam trade, the Shropshire or Dorset Horn ram may suit you better, but you are likely to get a nondescript wool, not profitable to the farmer. Working on the lines I suggest, always keep back your best ewe lambs. Do not do as many farmers in New Zealand do, sell all the first draft, ewes and wethers alike. The best ewe lambs are the ones that fatten first, and it is the ewes from the first draft that should be kept to work in for the breeding flock. The finest lambs I have ever bred were from half-bred ewes—ewes by English Leicester rams out of merino ewes—by Border Leicester rams. There I got three-part bred ewes with a beautiful big frame. The percentage of lambs in one field by Southdown rams from these sheep was 162. When you get to that three-quarter stage you want the Shropshire or the Southdown ram, because you have built up the frame to give you the right conformation with weight and early maturity—36 to 38 lbs. Ultimately, I believe the heavier lambs will pay better. It is most important, if the lamb trade is to be developed, that we should get away somewhat from the merino. The merino lambs are just as sweet, but they are a different colour, and do not sell so well. We must get the half to three-quarter bred, so that when the lambs go home they will compare with the lambs bred in the old country, or the lambs shipped from New Zealand.

In conclusion, let me say that farmers should take a lot of pride in their ewes, and try to get them nice and level. There is nothing more humbugging than to have every bale of wool of different quality. It is through doing these things well that the profit comes. I do not think sheep, generally speaking, are managed so badly as cattle. Both here and in other States I have seen downright bad practices in the management of their cattle. The want of management is not so marked amongst sheep, but how often do we find a farmer buying a few ewes at this sale and that, wasting a lot of time and getting an uneven lot of sheep. Let us do this thing thoroughly and take pride in having lines of well-grown ewes. Manage your sheep well, grow your wheat for the biggest crops, and use phosphates freely, and you can raise fat lambs in a district such as this."

Discussion.

At the request of the chairman the Professor willingly consented to answer any question that might be put to him, and a most interesting and instructive discussion ensued.

In answer to Mr. Snook, Professor Lowrie said that "takeall" was a fungus, the growth of which was encouraged through working the land dry.

To the same questioner Professor Lowrie said that practically the whole of the superphosphates used on the wheat crop in excess of the wheat's requirements would be available to stimulate the fodder crop in the next year. The land retained the phosphates and there was practically no exhaustion through leaching. Even on light land with heavy rainfall, the loss of phosphates would be very little.

Mr. Snook asked why it was that little advantage was gained from light land fallowed and worked in summer compared with the advantage gained from treating heavy land in that way.

Professor Lowrie said that through working the light land in summer it became too loose for wheat. It was a great mistake to work light land in summer. A fortnight ago he had seen a man ploughing very light land, and he had felt that so far as the next crop was concerned it would have been better had the horses been in the stable and the farmer at the seaside. Heavy land did not become so loose, of course, and the working often helped such lands through better aeration and preventing firm setting and loss of moisture consequent on this.

Mr. Stanley Parker asked if it was better to work the land before sowing or after.

Professor Lowrie said that if possible he always tried to do without dry seeding. Of course they could not always wait until the rain came, but he would prefer to work the land as little as possible until the rain came. It should be well worked in the spring.

In answer to Mr. Loton, Professor Lowrie suggested 5cwt. to 7cwt. of ground quicklime to the acre. It should not be applied with the crop, and would not be required very often. It could be put on at the present time of year. He hoped it would be on the market very soon, when it should be obtainable at about £1 per ton in sacks supplied by purchaser.

In answer to Mr. Coffee, the Professor said that in South Australia the first assistance given to the fat lamb industry by the Government was of the very smallest. Subsequently further provision was made for freezing, shipping, and selling.

In reply to Mr. Bernard, Professor Lowrie said that the wisdom of feeding off the crop depended on the length of the growing season. In New Zealand they always did it. In this district he did not think it would be a good practice. If they had heavy rains in March and the wheat came along quickly and showed signs of getting proud in mid-winter, it would be well to feed it off so that it would not come into ear before the frosts. In this district he would regard feeding off as a risky practice that would pay only in exceptional seasons. His successor in South Australia, Prof. Perkins, had tried it and found it a mistake.

Asked by Mr. Loton how to treat a crop of lucerne sown 12 months, Professor Lowrie advised a dressing of basic slag and a harrowing in the winter. Thomas's phosphates would do very well, but bonedust was too dear for the purpose.

Mr. G. L. Throssell proposed a vote of thanks to Professor Lowrie, and Mr. S. Solomon seconded.

Professor Lowrie briefly responded and a vote of thanks to the chairman closed the meeting.



BRUNSWICK STATE FARM.

1. Maize under irrigation, 63 days from planting.
2. In centre, lucerne under irrigation, being cut 26 days after last cutting.



PURE MILK.

BENEFITS OF PASTEURISATION.

(By J. A. KINSELLA.)

This milk question for human consumption has been so much discussed of late, and the public have been scared by reports of dirty dairies and of infectious diseases being transmitted by the milk, that I fear many have jumped at the idea of pasteurisation as a panacea for all the evils that milk is heir to. There is no doubt in my mind that pasteurisation properly carried out on the lines which I have previously indicated is a wise precaution under the existing condition of affairs in our city and town trade. The public and the milk vendors should, however, bear in mind that there is pasteurisation and pasteurisation, and that merely to label milk pasteurised is not to say that it is necessarily the least degree more wholesome than ordinary milk.

At the moment the benefits of pasteurisation to our milk supply would apply where there is lack of care in the handling of milk on the part of the producers, and careless treatment including the feeding and watering the cows on impure water will result in undesirable ferments being introduced into the milk, which render it almost impossible without some special means of treatment to produce and deliver a pure wholesome milk for city and town trade. All such foods as turnips, rape, wild onions, rank pastures and various kinds of weeds impart undesirable characteristic taints to the milk. The taints being volatile may be partly got rid of by proper aeration and cooling. Pasteurisation, on the other hand, expels these taints to a very large degree, and it also checks the other undesirable fermentations which cause so much loss to dairymen by the rapid souring of milk before being delivered to the consumers. The milk vendor would then be concerned in the question of pasteurisation and his ability to deliver a milk which does not contain disease germs.

The Use of Preservatives.

There is undoubtedly a considerable amount of preservatives used in the bulk of the milk at present supplied to our cities and towns. When in Denmark recently I made careful inquiries into the milk question there, and found that all milk delivered for human consumption as well as that used in the manufacture of butter and cheese was absolutely free from any kind of preservative whatever. The use of preservatives in any food used for human consumption is prohibited by law, and the law is stringently enforced. I consider that this is one of the strong points in favour of the high excellence and the extreme prices which the Danish people are able to command for their butter in the English market. There are two chief objections to the addition of preservatives to milk. The first is the very ill effect the preservative may have on the consumer, more particularly is this the case with infants, who consume milk largely and are most susceptible.

All substances capable of destroying bacteria in milk are not likely to be indifferent in their action upon the living tissues, especially the cells supplying the digestive juices. In this way it is claimed that digestive ferments essential to the human economy may be prejudicially affected. Again, on the other hand, some preservatives lessen the digestibility of foods containing them. Take for example, formalin; it enters into combination with the proteid constituents of food, the compound form being less digestible than the original substance, thereby entailing a nutritive loss to the consumer. The second objection to the use of preservatives is that they may be, and doubtless are, relied upon to protect those in the trade against the immediate results of neglect of scrupulous cleanliness. Under the influence of preservatives, milk may be exposed without sensible injury to extreme conditions which would otherwise render it unsaleable. I have found in factory work that milk may remain sweet to the taste and smell and yet have incorporated in it disease germs of various kinds, the activity of which may only be suspended for a time by the action of the preservative, but renewed activity of these dangerous germs may be resumed subsequently.

Besides these considerable disadvantages the gains are small. Preservatives cannot be added in quantities sufficient to kill the contained bacteria, but they merely stifle them for the time being. They also prevent, to a certain degree, the rapid multiplication of bacteria, and also check acidity or souring of the milk. To sum up, they disguise the true condition of the milk in which they exist. Their organised addition to milk, in my opinion, places a premium on uncleanly and improper methods of dairying. For these reasons, and in the light of these facts, we feel strongly that the addition of preservatives in milk for human consumption should be prohibited by law.

The Filtration of Milk.

The filtration of milk as a means of purification has been experimented with, and to some extent conducted on a commercial basis in connection with city trade in Britain, Germany, Denmark, and America. In Copenhagen, where this system of dealing with milk is conducted in a larger way than any place I know of, I had the pleasure of inspecting the Pure Milk Supply Company's depot in that city. The process adopted is briefly as follows:—The milk supply is received into large tanks which convey it to a large filter that is on a lower level than the milk vats. By means of a pipe the supply of milk is connected with the bottom of the filter and through the endeavour to find its own level the milk forces its way upwards through the cylinder in which are placed first layers of coarse, clean gravel, then layers of fined gravel, and lastly layers of cloth of a very fine mesh. The filtering material is removed each day, thoroughly washed, and sterilised, and afterwards dried in a high-pressure steam heating oven. Many other similar systems were inspected, the only difference being that the filtering material is thrown away after each operation. All milk treated in this manner is delivered to the consumers in the city in flint glass sterilised bottles. These bottles are handled in specially constructed baskets composed of wire, the object being to facilitate handling and to prevent breakages. The latter item is found to be an expensive matter in connection with city milk trade. There is, however, a new paper milk bottle just recently introduced which, in my opinion, will help the milkman to overcome many of his difficulties. These bottles are made of pulp, and lined with a thin coating of paraffin wax. They are only

used once and then burned, and are said not to cost more than the labour entailed in washing and sterilising glass bottles, the cost of installing expensive bottle-washing machines and sterilising ovens.

My investigations in Europe and America and inquiries made from authorities showed that by filtration of milk on the lines briefly described the bacterial contents are removed by one-third. But the filtering process is said to have the effect of holding back some of the butter fat globules from the milk, and owing to the enormous amount of labour, and the slowness and cumbersomeness of the process, and also the additional cost of carrying out the work successfully, the adoption of filtration of milk—on a commercial basis—is not likely to find favour or rather to make much progress even in the larger cities of the world.

DRY-FARMING.

CONSERVATION OF SOIL MOISTURE.

(WILLIAM MACDONALD, S.M. Agr.)

The most important problem in dry-land farming is unquestionably that which deals with the conservation of soil moisture. Hardly a season passes but we hear of crops which have failed because of lack of rain. The practical question is, therefore, "How can we control and conserve the soil moisture so as to save our crops in time of drought?" Now, in order to answer this question, we must first understand how the soil holds its water, and the part it plays in the mystery of plant growth. Nor should we forget that the water-holding capacity of any soil is a most important factor in determining the value of farm lands. It is also important to consider the way in which moisture may be dissipated or lost. In the first place, water, falling as rain upon a field, may be lost by surface runoff, or by percolation in the case of loose, gravelly soil; or, lastly, by evaporating from the surface of the ground. It is plain, therefore, that if by any means we can lessen this loss of water from the soil a larger and surer crop-yield will follow. All farmers are aware of the vast importance of moisture to the growing crop; but perhaps few realise the enormous amount of water that is needed for even a normal crop. Numerous experiments have shown that from 300 to over 500 tons of water are required on the average to produce one ton of dry *végétable* matter. In Wisconsin, King found that a two-ton crop of oat-hay required over 1,000 tons of water per acre, which is equal to about nine inches of rain-fall.

Again, the amount of water which a soil can hold depends chiefly upon the depth of the soil reservoir and the fineness of the soil particles. That is to say, deep ploughing and the thorough pulverizing of the soil are the two factors which enable any soil to hold the maximum amount of moisture.

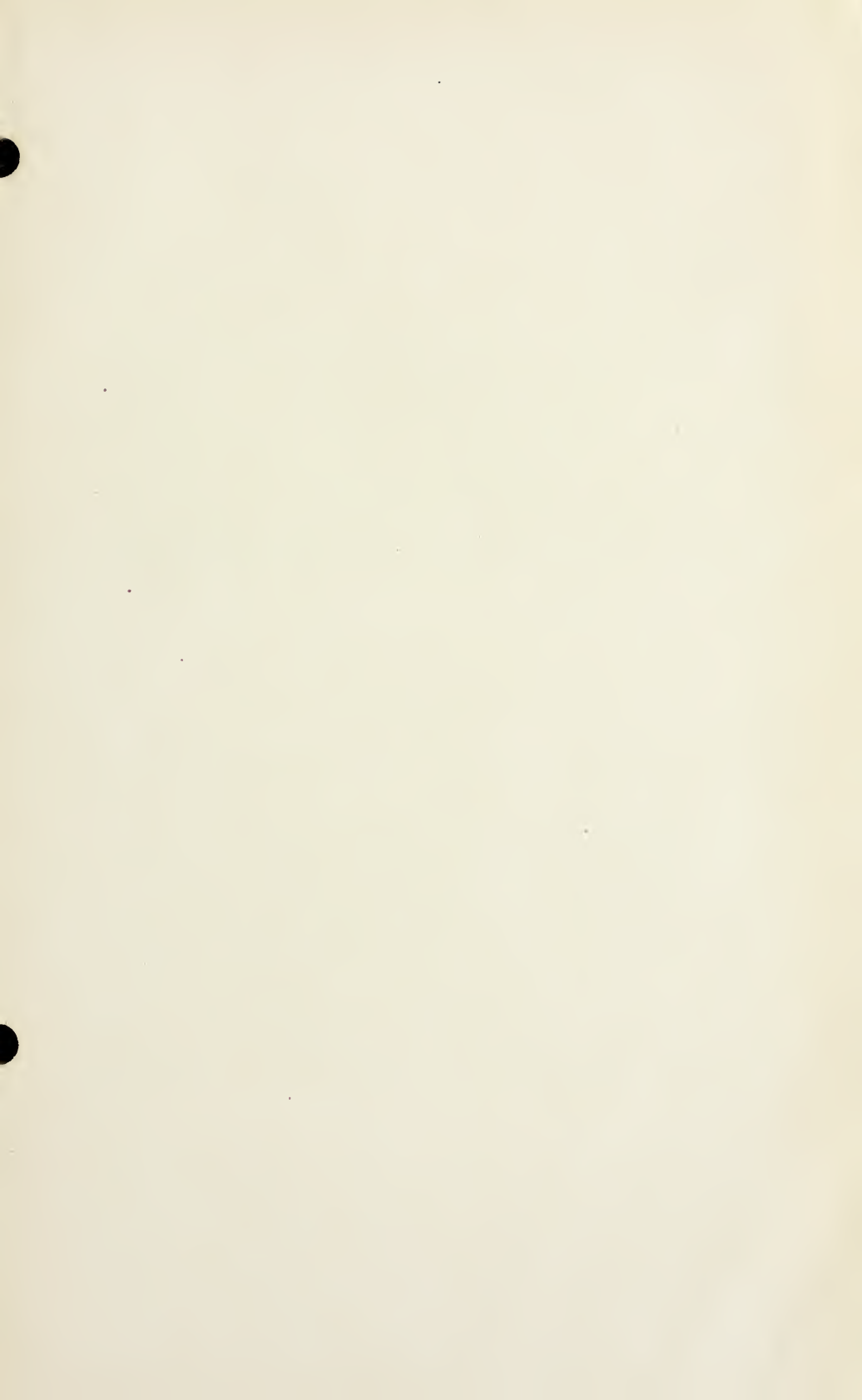
Most farmers are well aware of the advantages of deep ploughing, more particularly in dry seasons; but some do not yet fully comprehend the benefit of fining or pulverizing the soil. Now, since each individual soil grain is more or less surrounded by a film of moisture, as will be seen hereafter, it is evident that, other things being equal, the largest aggregate area of earth grains will retain the most water per cubic foot. Let us make this plain by a simple sum. Suppose that a cubic foot of marbles one inch in diameter has a total surface of 27.7 square feet. Now, for the sake of argument, reduce these marbles to one-thousandth of an inch in diameter, and you will find that the total area per cubic foot is increased to 37,700 square feet. From this little problem it is clear that the total amount of water capable of being absorbed by a soil which is cloddy and lumpy must be very small in comparison to that in a finely divided state, and not only is the absorbing power of the soil much less, but its capacity for holding moisture is likewise greatly diminished.

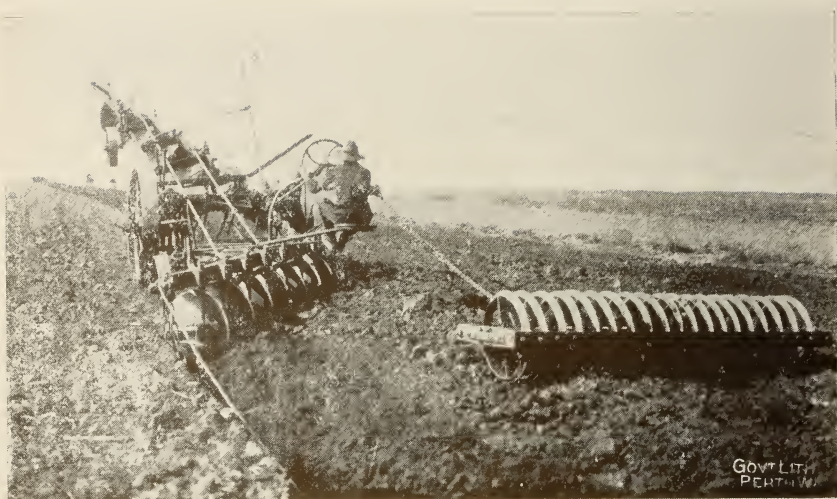
Free Water or Well Water.

It is well known that all fertile soils contain many tons of water, which is usually present in three forms as (a) free water or well water, (b) film water or capillary water, and (c) hygroscopic water or water vapour. Let us now see what these terms really mean. Free water is frequently called well water, ground water, standing water, or first water. It comes to the surface in the form of springs, and is usually the source of the supply of wells. If you dig a hole in any ground you will generally strike water at a certain depth, which may be several inches or many feet below the surface. This point is termed the "water-table." Now the surface of the water-table follows, roughly, the general contour of the land, viz., it stands highest where the ground is highest, and lowest where the land is low. In digging wells, therefore, the farmer must take care to sink the bottom of his well so far below the level of the water-table that seasonable changes will not cause it to go dry. As a recent authority remarks, "We must consider, then, that beneath all farm soils, at some depth, there is standing water, and that we plough and harrow above subterranean lakes." This is a most important fact, because if it is only a matter of one or two feet from the surface of the land to the level of the so-called soil-lake, there is evidently not enough dry soil for the plants to grow and thrive in, and, consequently, they are liable to sicken and die off. The depth of standing water most favourable to crops cannot be definitely stated, since so much depends upon the nature of the soil and the roots of the crop. Thus, whilst lucerne needs a fairly large amount of water to do well, its deep rooting habit renders it undesirable that the "first," or standing water, should be as near as three feet from the surface of the soil, whereas the shallower rooting cereals may be successfully grown with a water-level of this depth. Tap-rooted plants descend to an extraordinary depth in sandy loams, and for such crops a high permanent water-level is not good, since they can obtain their moisture supply at great depths and demand a feeding area vast in comparison with the soil mass at the service of shallow-rooted herbs. Thus lucerne roots frequently penetrate to the depth of twenty feet, and double this distance is not unknown.

Film Water or Capillary Water.

But the most valuable water in the soil and, at the same time, the most important for the dry-land farmer, is that which surrounds the soil grains





DRY FARMING.

1. Steam cultivation. Preparing fallow lands with 7-disc plough and roller.
2. Two sets of harrows doing 180 acres per day.

in the form of moisture films, and which is also known under the name of capillary water. It is this water which is absorbed by the roots of the plants, and, consequently, forms the direct source of supply of all cultivated crops. If you take a pebble and dip it into a basin of water or into the brook, you will observe a film of water closely sticking to the surface of the stone. This is an illustration of what is termed "surface tension," by means of which water, in the form of moisture films, is held in the pores of the soil particles. The existence of this physical force may be made clear by the simple experiment of floating a carefully laid clean needle on the surface of water, or by the fact that a drop of any liquid tends to assume the smallest possible space—that is, the shape of a sphere. In short, the free surface of any liquid tends to become a sort of stretched elastic film under molecular attraction; and this is what happens to the soil films under the action of surface tension.

Now, if very fine capillary (from the Latin word meaning a hair) glass tubes are dipped into water, the water will rise up the tubes in inverse proportion to their diameters, or, in other words, the smaller and thinner the tubes the higher will the liquid rise. Again, if the bottom of a tube containing soil is placed in contact with water the moisture will be drawn up one, two, three, or even more feet, depending upon the nature and the fineness of the soil. The movement of film water is usually referred to as "capillary action," and it was formerly supposed that this moisture passed upwards to the surface by means of capillary or hair-like tubes. In reality, there are no such tubes, merely fine passages, pores, or capillary channels, and the film water rises from the sub-soil by means of surface tension. Thus, when the sun is hot, or a drying wind scorches the ground, the soil moisture rises—as oil is drawn up to feed the flame of a lamp-wick—from the water-table below, which may be two, six, or twenty feet beneath the surface of the ground, viz., wherever free or standing water is found. Hall mentions the steady rise of capillary moisture through 200 feet of fine-grained chalk during a dry season in the south of England.

Furthermore, capillary action depends on the fineness of the soil particles and their closeness to each other. In coarse, loose, sandy, or gravelly soils the action is weak; in fine, well-compacted soils it is strong. Thus in the conservation of soil moisture capillarity is a matter of the utmost importance; and, accordingly, in selecting a farm or a portion of a farm for dry-land crops, this problem should be most carefully considered. Most farmers are aware that in a severe drought it is always the crops on gravels and coarse sands, having a poor lifting power, which suffer first, since the sub-soil water is with difficulty drawn up to the roots of the plant. Should the drought continue, the clay soils suffer next, for, although they may start with a much larger supply of soil moisture, yet the water moves very slowly through the very fine pore spaces, and the upward lift cannot keep pace with the loss at the surface due to transpiration* and evaporation.

As Hall** remarks, and the writer's experience bears out this statement, "The soils which are least affected by drought are the deep loamy sands of very uniform texture, fine-grained enough to possess a considerable lifting surface, and yet not too fine to interfere with the free movement of soil water. The western soils which American writers describe as capable of withstanding an unbroken summer drought of three months' duration are

*Evaporation of water from the leaves and stems of plants.

** "The Soil," by A. D. Hall, page 95.

deep, fine-grained, and uniform, with practically no particles of the clay order of magnitude to check the upward lift by capillarity." In the Transvaal, in many districts a most casual examination will reveal two types of soil from an agricultural standpoint. The one may be characterised as a shallow, sandy soil, one to three feet in depth, resting upon a gravel sub-soil; while the other is a deep uniform loam from ten to thirty feet in depth. It need hardly be said that the second soil—the deep loam—will remain practically unaffected in dry weather, whilst plants on the shallow soil are wilting, parched, and dying. But the extraordinary thing is that intelligent men will buy farms without the faintest conception of the nature and quality of the sub-soil—a matter which can be readily ascertained, in a few hours, or a day or two at most, by examining cuttings, wells, railroad embankments, digging pits here and there, or by boring with a simple post hole auger, as well as by taking stock of the growth and depth of the root-system of native trees and shrubs, grasses, legumes, etc.

For the dry-land farmer the best "agricultural bank" is surely his depth of soil. And it cannot be too strongly stated that all farmers should make themselves thoroughly acquainted with the character of their soil down to the depth of at least four, but preferably six to eight, feet. The wisest agricultural chemist in the United States to-day, Professor Hilgard, remarks "that it is hardly excusable that a business man calling himself a farmer should omit the most elementary precaution of examining his sub-soil before planting an orchard or a vineyard, and should at the end of five years find his trees a dead loss in consequence of an unsuitable sub-soil." Again Hilgard says: "Eastern emigrants, as well as a large proportion of Californian farmers, do not realise the privileges they possess in having a triple or quadruple acreage of arable soil under their feet, over and above the area for which their title-deeds call."

Hygroscopic Moisture or Water Vapour.

We now come to the third way in which water may occur in a soil. This is as water vapour or hygroscopic moisture, a term which is derived from the Greek word meaning wet. If you take a tumbler of cold water into a warm room the glass becomes coated with a thin film of hygroscopic moisture produced by condensation. Again, the surface soil absorbs water vapour from the air, and more especially during heavy dews and mists or in cool, damp nights. Thus it is that in some parts of the world—notably California and Chili—summer fogs have a markedly good effect upon vegetation. And although this moisture is of but little value save in times of severe drought, it is not to be despised by any means. During the hot days of summer a soil of a high absorptive power, such as a well-tilled clay loam, will retain its moisture for a much longer time than a soil of low absorptive power, such as a shallow sandy soil, whose store of moisture will be exhausted in a few hours, while the surface of the land itself is heated up to the scalding point, thereby searing the stems and root-crowns of the growing crop. It is also worthy of note that, generally speaking, soils of high absorptive power are also those of high capillary power.

Hilgard summarises hygroscopic moisture as follows:—

1. Soils of high hygroscopic moisture can withdraw from moist air enough moisture to be of material help in *sustaining* the life of vegetation in

rainless summers or in time of drought. It cannot, however, maintain normal growth, save in the case of some desert plants.

2. High moisture absorption prevents the rapid and undue heating of the surface soil to the danger point, and thus often saves crops that are lost in soils of low hygroscopic power.

The Soil Mulch.

Having spoken of the various ways in which moisture may exist in the soil, we now come to a discussion of the best means of conserving this moisture. This can best be done by what is commonly known as mulching. Any material which is spread upon the soil to shade the surface from the sun and to break the connection between the water-bearing sub-soil and the exposed evaporating surface, is termed a mulch. In gardening operations leaves, manure, coarse hay, straw, grass clippings, etc., are commonly used. Such mulches of loose organic material are very effective—even more so than a mulch of fine earth—but they hinder the continual stirring of the land, which promotes aeration and nitrification.* Stones serve practically the same purpose as a mulch, if they happen to be spread thickly upon the surface of the ground, as they shield the land from evaporation and so tend to keep the soil cool and moist. In the bleak, wind-swept county of Caithness, in the far north of Scotland, the writer has known of cases in which the removal of the numerous small pieces of slate and stone—which are often found on the arable lands of that region—has caused a marked decrease in the crop of the ensuing season. Everywhere you may see homely examples of the principle of mulching. Turn over a board or stone lying on the ground; the soil beneath is more moist than the ground near by—for the pores of the earth have been closed, and the current of moisture passing upward has been stopped. That is why fisher lads look for earthworms beneath stones when the weather is dry.

But the most useful and practical mulch in dry-land farming is that which is made of loose dry soil. This is done by stirring the surface of the soil with any implement of tillage such as the plough, the harrow, or the cultivator. Now in closely packed soil capillary water moves freely, and as the surface layer dries under the action of the sun and the wind, fresh supplies of water are lifted from the sub-soil by surface tension, with the result that there is a steady rise of sub-soil water to the exposed and rapidly evaporating surface. In a word, we may think of the sun and the wind as a mighty double-acting force-pump. An American experimenter found that each square foot of an ordinary farm soil during the summer months lost 1.3lbs. of water daily by evaporation from the surface of the land or, in other words, over five inches in a single month. But should the top layer of soil be broken up and left loose upon the land by cultivation, then there is no longer one continuous film linking the exposed surface with the sub-soil water; and, consequently, surface tension can only lift the water so far as the film is unbroken, *i.e.*, as far as the unstirred soil extends, and this layer is protected from evaporation by the loose soil above. That is to say, when a soil mulch is formed the capillary channels are broken and the water cannot rise into the loose layer of surface soil which is separated from the firm soil below by large spaces, across which moisture cannot pass. Accordingly, King writes:

*Process of changing nitrogen into nitric acid and nitrates.

—"In the conservation of soil moisture by tillage there is no way of developing a mulch more effectively than that which is produced by a tool working in the manner of the plough—to completely remove a layer of soil and lay it down again, bottom up, in a loose, open condition."

In the humid regions of America it has been found that a soil mulch of a depth of three inches is sufficient to conserve the moisture of the soil. But in California, and the semi-arid west, fully twice that depth is necessary for proper protection during the dry, hot season, which sometimes lasts for three to six months at a stretch. This is particularly true of orchard-cultivation in South Africa. For where the cultivation has been shallow—one to three inches—you may frequently observe that the leaves of the trees wilt badly under the hot sun, but recover later on, or during the cool of the night-time, whereas with deep cultivation the trees do not appear to suffer at all, even during the hottest weather. At the same time, in the case of land intended for small grain crops, a three-inch soil mulch is preferable, as otherwise the soil is apt to become too dry close to the surface where the seed germinates, and where the first roots forage for both food and moisture.

Summary.

Summing up, we have seen:—

1. That the first step in conserving moisture is to put the soil in such a condition that it will permit the rain to enter freely, and into a good, deep reservoir.

2. That water exists in the soil as free, capillary, or hygroscopic, but that free water within eighteen inches of the surface is harmful to the growth of cultivated plants, whereas capillary water is the direct source of their supply, and should be conserved by all possible means.

3. That capillary action depends upon the fineness and the closeness of the soil particles. Consequently, in loose, coarse, sandy, or gravelly soils capillary action is weak, whereas in fine and well compacted soils it is strong.

4. That if the capillary pores in the soil are continuous from the moist sub-soil to the surface, the moisture rises rapidly and passes off into the atmosphere by evaporation. When, however, these pores are made larger near the surface, the upward flow of the moisture is arrested. This can be done by light surface cultivation, which produces a *soil mulch*. But as soon as the soil becomes baked or encrusted the capillary connection with the air is renewed, and tillage is again required to re-establish the soil mulch, and so conserve the moisture in the soil.

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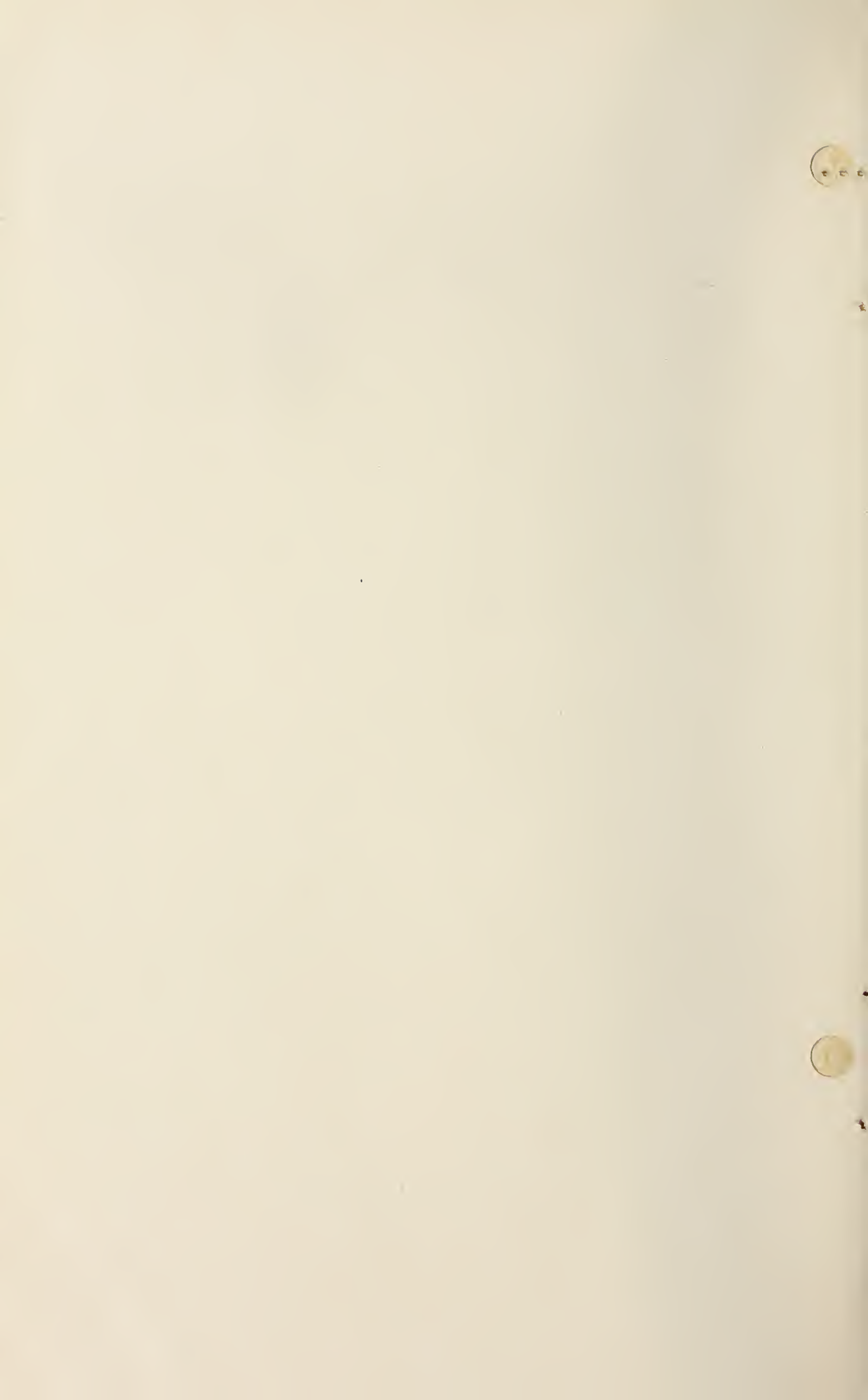
In Circular No. 10, United States Department of Agriculture, Bureau of Plant Industry, Mr. William M. Jardine has an interesting note on dry land agriculture in Colorado which runs as follows:—

"In Colorado I visited the dry farm of Mr. E. R. Parsons, located twenty-three miles south-east of Denver. Mr. Parsons is a very intelligent Englishman. He came to this country from the Transvaal, South Africa, where he had considerable experience in dry farming. He has a commercial orchard which was set out in 1895. Mr. Parsons is now independently wealthy, and I am informed that he has made nearly all of his money out of his dry farm. He says that the success obtained in producing crops without irrigation in eastern Colorado will depend on the man.



DRY FARMING.

1. Harrowing to form soil mulch.
2. Forming soil mulch—rolling and harrowing.



"Mr. Parsons attributes his success to the thoroughness with which he cultivates his soil. He never ploughs his land less than nine inches to 12 inches deep, whether it be sod (turf) or otherwise. This is usually done with a hand plough pulled by four large horses. Mr. Parsons does not approve of the disc plough now so commonly used by our dry land farmers. In this respect I heartily agree with him. Sod land especially should be turned over completely in order that the sod may rapidly and fully decay, and, at the same time, serve as a blanket to retain the moisture that has fallen and accumulated in the soil previous to ploughing. This cannot be accomplished with a disc plough. The disc twists and breaks up the sod, leaving it in clods, thus presenting a very loose and uneven surface which permits a free circulation of air and thus favours rapid evaporation of moisture from the ploughed land. On the other hand, where the sod is turned over completely, the moisture is retained during the entire summer, thus enabling the farmer to prepare a favourable seed bed for planting to winter grain—the crop that now predominates in eastern Colorado.

"In this connection I may state that one of the greatest mistakes new settlers are making in breaking up their land on the plains is in the use of the disc plough instead of the mouldboard breaking plough. This is probably due to the fact that with the disc plough, which is of somewhat lighter draught, the farmer can plough up his land more easily and more rapidly. The results obtained from this hasty method are, however, fully evident at harvest time. In my judgment the use of the disc plough should be discouraged."

OSTRICH FARMING.

South Africa affords indisputable evidence of the value of ostrich farming as a staple industry, and the many points of similarity in the agricultural and climatic conditions of Western Australia have created much interest in the minds of several persons who advocate the pursuit of the industry in this State. Many inquiries and letters have been received on the subject by the Department. Among these contributions are an article by Mr. H. Nathan, veterinary surgeon, of Geraldton, and a letter addressed to the Minister of Agriculture by Mr. E. C. MacMillan, of York, both of which we publish in this number for the benefit of our readers.

PAPER BY MR. NATHAN.

Introductory Notes.

One of the most important industries is ostrich farming. Large sums of money are being spent on sheep and cattle with the object of helping the man on the land. There is no country in Australia that I have seen where ostriches would thrive better at so little cost than the whole of the country from Dou-

garra to the extreme limits of the Murchison, and yet there is not a single feather exported from this country, where there should be an extensive industry carried on, bringing in a great revenue.

All that is required is for the Government to import a few birds and carry on the experiment under competent hands, say at the Chapman Farm, and in a few years an industry would be established, and every farmer would have his little flock of ostriches. There is no difficulty in their management when the farmer is properly instructed, and I know of no industry where small capital can be invested to so great an advantage. Now that Lord Avebury's Act for the protection of small birds is an accomplished fact, ladies are at a loss for feather trimmings, and ostrich feathers are still going up in price.

Ostrich farming may be said to have commenced at Grahamstown as far back as 1867, and the amount of capital invested at the present time in the industry in Cape Colony alone exceeds £10,000,000, with an annual export of nearly 200,000lbs. of feathers, valued at £1,400,000. For many years the settlers of South Africa hunted the ostrich and killed it for a single crop, constantly coming across nests, but never thinking of attempting domestication and reaping two crops a year, although they frequently saw feathers sold almost for their weight in gold. In 1867 the export of feathers (all wild), was valued at £70,000, and prices were no higher than at present. The fluctuation in prices has not been so great as in other products. Some few years ago, so important did the South African Government think the industry, that an export duty of £100 per bird and £5 per egg was imposed. Now, I am informed, it is a criminal offence to export either a bird or an egg. One of the greatest guarantees of the price being kept up is the fact of the feathers entering so largely into the Court dress of Europe. Where the emus thrive there will the ostrich be found to prosper. The two birds are of the same genus and habits, and exist on the same food. The ostrich family consists of four species—the ostrich (*Struthio camelus*), the emu, the rhea, and the cassowary. The family characteristics are the possession of rudimentary wings, of no use in flying; the barbs of the feathers of equal length on both sides of quill; the breast rounded instead of being like a keel as in birds that fly.

Anatomical Notes.

My object in now referring so minutely to the anatomy of the birds is to enable my readers to know the various organs when I refer to them in the course of subsequent pages. The art of caponising ostriches is as necessary an operation in this industry as in other stock-raising pursuits, and will also be better understood when the anatomy of the bird is explained.

The ostrich has only two toes, and is twice the size of the emu, its eggs averaging 3lbs. or over, with a thick porcelain-like shell. The head and neck are bare of feathers. The beautiful feathers of the wings and tail are prized for their value, whilst the only other member of the family producing marketable feathers is the rhea.

As regards the anatomical formation, the ostrich walks on its toes, the so-called ankle joint being equivalent to the second toe-joint in the human. The knee-joint corresponds with the ankle joint, and the thigh corresponds with the calf, the thigh proper being the short thick bone above this. The wing, which constitutes the principal value, is small in comparison, but is perfectly formed.

The head is abnormally small in comparison to other proportions, and hence the brain is of very limited size. It is calculated to be as 1 to 1,200 of the remaining body bulk, which is very low as compared with the paroquets (1 to 45) or eagle (1 to 160), and yet the bird has some high animal instincts, especially as regards maternity. It has been known to be able to distinguish a chick that is fast in the shell and help it carefully and skilfully into the world. The neck is of remarkable length. The heart lies immediately at the base of the neck, where it joins the body. The lungs lie in the thorax or chest, extending down the ribs, but not adhering to them. They are practically of the same construction as in other birds. The liver is placed behind the breast, and is devoid of a gall bladder. It is of a deep plum colour.

The diaphragm or skirt isolates these organs of the thorax, and separates them from the organs of the abdomen. The gizzard or mill should always contain stones, and is of the same construction as that of the ordinary gallinaceous birds, but on a larger scale. The crop or stomach is a bag for receiving the food when swallowed, and mixing it with certain juices secreted from small cells or glands. The stomach is held by a membrane to the left side of the bird, to the left side of the backbone and to the diaphragm.

When the stomach is empty the right side of the abdomen contains only the first small intestines. When the stomach is full it extends from side to side of the abdomen. The intestines are divided into small and large. The food is converted into a substance called chyle in the former organs, and it is here that we find the tapeworm if present. The small intestines extend from the gizzard to the blind guts or coecae. The stomach and gizzard are connected together. The large intestines continue from the coecae. The maniple, which somewhat corresponds to the bible in bovines and sheep, extends on to the rectum or last intestine, and it is in these organs where constipation originates. The glands in the male and the ovarium of the female are to be found under the hump of the backbone.

The kidneys extend from the latter organs along the backbone to the bladder. This organ is simply an enlargement of the extreme end of the intestines. The usual method of arriving at the age to which animals live is to calculate six times the period that they take to mature, and this would give the average age of the ostrich as 24 years, but it is well known that 75 is nearer the mark.

Ostriches in New Zealand and South Australia.

About 22 years ago Messrs. L. D. Nathan and Co., of Whitford Park, Auckland, N.Z., imported some thirty-five birds into that country. Now they are able to boast of one of the largest farms in the world, and containing fully 2,000 birds. They have also established factories for the manufacture of feather trimmings, dyed feathers, dusters, boas, and fans. The consumption of ostrich feathers is so great that even now the wants of the home market in New Zealand cannot be half supplied, and there is still a large import trade in that country. About 30 pairs of breeding birds are here kept, each pair being accommodated with a fenced paddock of about three-quarters of an acre, with a small ti-tree shelter shed in which to nest. This is required in a wet country like New Zealand. The male bird sits about 14 hours daily, and the hen bird does duty for the remaining 10. They have not yet come under union rules, although New Zealand is a Labour country. The eggs take six weeks to hatch. Owing to the luxurious growth of vegetation in New Zealand,

cattle are kept to eat down the feed, as the birds which thrive here on natural grasses and lucerne, prefer short feed. The industry has now become so great that from so small a beginning a limited liability company has been formed, with a very large capital, and is already paying remunerative dividends.

In South Australia, in the year 1881, Mr. W. Malcolm imported some ostriches from South Africa. A large number of young birds were successfully hatched and reared at Gawler, 25 miles north of Adelaide. An Act was passed by the South Australian Government offering the fee simple of 5,000 acres as a bonus for establishing the industry in that State, conditionally that it should be claimed by the person who first placed 250 ostriches over one year old on the land. Mr. Malcolm's venture was formed into a company, which claimed the country by complying with the required conditions, and 250 yearling birds were placed on the grant, which is situated near Port Augusta, in that State. This country is anything but picked pastoral land, having an average annual rainfall of less than eight inches. The birds have done well and increased largely, having doubled their number in the first five years. Salt bush is their principal fodder, but they do well on all the natural bush and herbage, eating with avidity wattle, mulga, acacia, and cotton and blue bush.

In ordinary seasons the breeding birds lay freely without any artificial feeding, existing solely on what they get in the paddocks. The chickens are reared under natural conditions. These chicks are very robust, and grow into more valuable birds than those that are hatched in summer and have to be artificially fed on cabbages, lucerne, rape, and sorghum on account of want of moisture in the natural herbage. No matter how liberal this artificial diet is, the summer chicks are far inferior to the winter chicks in size and stamina. These facts undoubtedly prove the efficacy of the natural bush feeding. Young chickens should be kept in small paddocks, and handled and driven about so as to get them thoroughly broken in, and when once this is accomplished they are always easily handled; but for the six months that they are growing feathers they should be allowed as much space as possible to roam about in, being mustered and driven about every fortnight, when they can then be counted. They are apt to get wild if left unmustered too long, but when once broken in when young, they seldom give any trouble afterwards. If left until six months old it is a difficult matter to tame them afterwards.

Fencing.

Ordinary fencing is adequate, but in South Africa the usual height, if intended for ostriches, is 4ft. 9in., of 3 or 4 wires of any suitable gauge that will do for sheep. This just about reaches the base of the necks, and prevents any attempt at stepping over, the less number of wires the better, as it minimises the chance of entanglement. In South Africa brush fences, stone wall, and wire are all used, whichever is cheapest or handiest.

Age Characteristics.

"Guaranteed breeders" is a trade term that implies that the birds in question are four years or over, and have bred. It is of no use to attempt to breed from birds of a less age than four years without expecting to attain disastrous results in deformities, weaklings, etc. The distinguishing marks of the various ages are as follows:—At 6½ months the quill feathers will be

ready to cut, and some of the body feathers will have started to change and the young cocks' legs will show yellow in front.

Twelve months.—Second growth of quill feathers, visible black leg feathers begin to show, and bills and legs should show white.

At two years all chicken feathers should have disappeared from the backs. Most of the little white belly feathers should be replaced by blacks or drabs, and cocks should show quite black, according to sex.

At three years all chicken feathers should have disappeared. The last to go are at the base of the neck. Some of the cocks should show red in front of leg and on the bill.

At four years.—This is maturity. The breeding organs are fully developed. In season, the cocks' back sinews of the leg are pink, and the front of the leg and bill scarlet.

After five years birds can only be distinguished by the general coarser appearance and by the coarseness of scales in front of legs.

Breeding.

In choosing stock birds for breeding, the amateur should endeavour to procure birds of at least four years old or over. If possible, they should be chosen by persons of some experience, as it is quite likely that they will otherwise be put off with the culls of some flock. Avoid sisters and brothers, as in-and-in breeding with birds tends to the development of deformities and disease. He should insist on having a guarantee that the birds have bred for one or two seasons, and have had at least three nests. The older the birds the better they are for breeding, as they sit more steadily, breed more freely, and bring out a larger percentage of chicks. White feathered hen birds are, of course, most fashionable, but the colour should not be sacrificed at the expense of the quality of the feathers. Hens with feathers of good breadth, closeness, and droop, although dark in colour, are far more valuable than white feathers of inferior quality. The dark hens are known to transmit the quality of their feathers to the male progeny. It is essential in starting the industry that the greatest care should be exercised in selecting the breeding stock. It is better to start small than to have a number of nondescript birds. The birds should have well-developed muscular frames, great depth of girth, prominent, bold eye, and thick, powerful legs with large feet. They should be broad across the back, with a slight furrow running down the middle. The body feathers should be rich in colour, and curly, with a shiny gloss in them. Wild birds should be avoided, but pugnaciousness is a good characteristic.

Paddocks.

The camps for chickens (that is, up to six months old) should be small, fenced-in paddocks, where they can be frequently handled and driven about. This gets them used to people and their surroundings, and when once properly broken in, they are always easily managed. Water is not essential for the breeding birds. They do not require it if the feed is succulent, but for young, growing birds it is better for them to have access to it. Where the paddocks are large, the cocks seldom fight, as one is always boss, and the others soon find this fact out. In small paddocks the cocks sometimes look for fight, and walk up and down the dividing fence, but this can be stopped by a few boughs interlaced. Crushed bones, lime, and salt should be accessible, also plenty of gravel. The male leaves an unmistakable sign on the left side of his mate's tail when

the birds have paired. On no account go into a camp where there are breeding birds without having a good stout bush containing a fork. This should be stuck under the bill of the bird when he charges, which he invariably does when breeding. You need have no fear, as he soon finds he is beaten, and goes away. When the breeding birds are being kept in paddocks of 20 acres, they will lay and hatch without extra feeding other than what I have already described, but in bad seasons 3 or 4 lbs. of grain each will keep them in excellent condition. The best plan is to put two hens with one cock in a paddock of about 100 acres, that is if artificial incubation is intended, as the birds will do all the laying and no sitting, and an increase of eggs results. Under such conditions, two hens and one cock, over four years old, costing about £200, have been known to produce 118 eggs, 115 of which were successfully hatched, the chickens being sold for £10 per head at three months old, giving the handsome return of £1,500, which, after deducting the cost of the parents (£200), shows a profit of £1,300 in twelve months.

I ask my readers if there is anything like this in any other agronomic industry.

The Young Chicks.

As the birds are hatched they can be given to a boy to look after, and kept housed for the first month if the weather is cold. The eggs take six weeks to hatch. The first food required is the dung from their parents, or fresh cow dung, and then chopped-up succulent food, such as pig melon, prickly pear, leaves, cabbage, or any similar food. Plenty of crushed bones and gravel should be at hand. The young birds should be handled as much as possible, and driven short distances daily. With this treatment they become perfectly tame and docile. The birds can be branded on the thigh, which is bare of feathers. The year they are hatched should be shown in the brand in order to know when they are ready for plucking.

Branding.

The brand can easily be made out of thick fencing wire, which is preferable, twisted into the required shape. There should be at least four to ensure the iron being red hot, so that it can be dabbed on and not kept on, as this is too severe and causes a sore. A rag dipped in carron oil or a solution of picric acid, either of which will effectively remove any pain, should be handy. The best dimensions for a brand is 4 in. letters, with not more than $1\frac{1}{4}$ in. on the edge. Branding can be done at three months old, but care must be exercised as the skin is tender. Besides the owner's initials or registered brand and date brand, it is necessary to have a distinguishing mark for culling at plucking time, so as to mark the best breeders and feathered birds from those with inferior form or feathers. The latter should be caponised to act as mothers. The birds should be placed in the plucking box and fed on a little corn, and then branded in the usual way.

The Egg.

The germ of life floats on the top of the yolk, and is suspended from the ends of the egg by two spiral cords. These are so beautifully arranged that no matter in what position the egg is placed, the germ invariably comes to the top, so that all that is required to alter this liquid mass into bone, muscle, and vital organs is the proper application of a temperature of 102 deg. Fahrenheit. Most people believe that the yolk is the origin of the chick, but this is an error.

as the white or albumen contains the embryo, and the yolk is simply the feeding medium whilst the chick is in the egg, and for the first few days after it comes to light. The impregnated ova, when ready, drops away from the ovarium or cluster of unfertilised eggs, and falls down the oviduct, when the albumen or white is added, then the two white skins, then the shell, and, lastly, the colouring.

Nests.

When a nest is discovered of, say, three eggs, it is advisable to give it proper drainage, so as to prevent it being inundated in rainy weather. Dig a round hole two yards by half a yard deep, close to the nest: throw up what you take out, and fill in the hole with sand or gravel. In a day or two move the eggs on to this. If the eggs are moved at once, the hen becomes frightened, and clears. The birds have a habit of throwing up earth with their beaks amongst the eggs. By having the nests of sufficiently wide diameter this is prevented, as they cannot reach it when sitting. In my opinion the industry cannot be carried on without an incubator, as birds vary so much in captivity, some sitting close, and others going off and on. I have come to the conclusion that to be a success one should take no risks of this sort. It will be frequently noticed that chicks often have a hard lump in the region of the navel. It is advisable to push this in, an operation easily performed. This is a part of the yolk that has been left out, and the chicks that are in this condition do not thrive if it is left out, as they lose nourishment. In a climate like ours the sand or gravel nest is quite sufficient, and wurleys are quite unnecessary. Never on any account go near birds that are laying or hatching, as they become intensely savage, and should never be approached without a good bush.

Laying.

It is advisable to have three or four plaster of Paris dummies, which can be made by greasing a real egg and pouring plaster of Paris over it, then cutting it in half with a saw and using the mould greased as a negative. Place these artificial eggs in the nest when the birds have laid two or three eggs, which then remove, and send all fresh eggs as laid to the incubator. By this means 30 or 40 eggs will be laid as against 10 or 15 in the ordinary way.

Temperature of Incubation.

As I said before, the correct temperature is 102 Fahrenheit for the first 14 days, and then no harm can be done with a range of 98 deg. to 104 deg. for a short period. Turn the eggs daily, and let them air for 20 minutes daily at least. When the chicks are near hatching it is hard to keep the temperature down, but if possible it should not then go over 100 degs. Fahrenheit.

Progress of Artificial Incubation.

If the eggs be held against a strong light inside a box, a hole almost as large as an egg to place it in, the first change that is noticed is a dark spot floating about on the side. In a day or two this will be found to extend until the egg eventually becomes quite opaque, with the exception of the air space at one end, and if the process of artificial incubation has been properly carried out this air space should be perfectly defined by a thick outline. If the egg is not good, or unfertile, a semi-transparent space will be seen below this line. The egg at 20 days should be quite opaque, excepting the air space. Mark the

air space end with the date when first put in the incubator. About the 36th day the air space will appear to be considerably enlarged. This is on account of the chick falling in the shell. It will soon be observed to rise again, and when the shell is observed to appear quite full it should be marked, and if in 24 hours the chick has not broken the shell, crack the egg at the air space end and break away some of the shell, when the chick will manage to do the rest. The instinct of the parent in nature tells it when a chick is unable to break through, and it rolls the egg with its beak until it is in the right position, when she uses just enough force by pressure under the hard, horny portion of her breast to effect the necessary fracture of the shell without injuring the chick. They have even been known to pull the chick out with their beaks without injury. As soon as the chicks are out of the shell, remove the *débris* and keep the chicks in the drawer until the following day, when, if it is cold weather, put them out in the sunshine, or shade in hot weather, in a small enclosure, of course, to prevent roaming.

Food.

The first food is the droppings from the parents, or in lieu thereof, fresh cow dung. This and gravel is all they need for the first four days. They should be left to the charge of a capon, or kept warm in the incubator at night if cold weather for at least the first month. After the fourth day they will commence to eat green feed, such as chopped up cabbage, or anything that is available. They will also eat prickly pear leaves (without the prickles). After the first week they can be sent out in charge of a boy and a capon in a small paddock, where there is natural feed, and housed at night, when a small quantity of grain should be supplied. At three months they can be left out in a paddock, where they will look after themselves. After four months all that is required is to muster occasionally to keep them docile.

Plucking.

The best kind of yard is to select a site where all the paddocks are easily accessible. Fence the enclosure with a strong five-wired fence, about half an acre in area. The fence should be interlaced with bush, and should have a wide gateway. At one corner an enclosure should be made 18ft. x 12ft., of jarrah posts, with stout boards, planked 18 inches from the ground up to 5ft. in height. Leave a wide gateway to admit the birds from the larger yard at the other end. There should be a door for them to pass out after plucking. This should open outwards, and be about 2ft. 6in. wide. Opposite this door the plucking box should stand, the dimensions of which should be 3ft. long, 2ft. wide, and 3ft. deep. Old birds will stand anywhere and submit to be plucked, but the young birds should always be boxed. A cloth bag, large enough to put over the bird's head, should be in readiness, and this should have two holes to fit over the beak, so as to admit plenty of air. With this on, the wildest bird will stand perfectly quiet. The best implement for taking the feathers is a pair of ordinary pruning scissors. The birds should be plucked at seven months. At six months the feathers have nearly all attained their full growth, but it is better to wait a month to make sure of this, as the stalk at the junction of the wing with the feather has dried, but below this it is still growing. The feathers should be plucked at this stage or they will deteriorate, the vitality in the upper stalk having gone. The point, which is the most valuable portion, will generally get injured as it becomes brittle.

The mob are driven into the large yard, and from this the smaller one, or crush, is filled, care being taken not to rush the birds about. Two pluckers go into the crush, seize a bird by the neck, always standing at his side to prevent being kicked, and, placing the bag over his head, push it into the plucking box facing the exit door. A man on either side soon accomplish the plucking. It is then entered up in a book kept for the purpose, and pushed out through the outlet door into a paddock.

To pluck a seven month bird, which is the first plucking, the method is as follows:—After the bird is in the box, the pluckers first take three rows of brown feathers growing along the wing and partly covering the long whites. They are pulled for the whole length of the wing to its junction with the body. Three rows of the fluffy feathers from the lower part of the wing are then taken. The white feathers are cut, leaving half an inch of quill protruding from the wing. The long fluffy feathers which grow next to the bird's body should never be taken, as they are of little or no value, and are required for warmth by the bird. After pulling the tail feathers, the plucking operation ceases, and two months later, when the blood vessel has dried up in the butt of the quill, the bird should be again placed in the box and these extracted with a pair of pincers. There is no bleeding, and the operation is quite harmless and painless, but very necessary, as on the operation depends the value of the next crop, as if left in too long, twisted feathers result.

Proper books of results should be kept, especially in the early life of the birds. By being methodical in this respect the value of each individual bird, with the weight and quality of their feathers, can be recorded. Care should be taken to tie up the feathers in bundles as taken from the birds. This will facilitate sorting. In plucking young birds, the flesh should be held down with the thumb and finger. This will facilitate the operation, and prevent the possibility of spoiling the socket. If this happened, there will be a blank for ever. In nature, the birds do not moult, only shedding a feather here and there at intervals. This accounts for wild feathers being so much larger and heavier than tame ones. As regards the taking of feathers, I am inclined to think that there is still much to be learnt, and I trust that I may shortly have an opportunity of experimenting in this direction.

The Market and Preparation of Feathers for Sale.

There is a large home market for ostrich feathers throughout the Commonwealth. Factories are now established in all the large centres where the raw material generally imported is turned into trimmings and dressed plumes. This is, I believe, the only State where the industry does not thrive. The importation of trimmings, boas, and plumes into W.A. alone would give employment to a considerable number of men, women, and children, and it is surprising to me that some of the wholesale houses have not taken the industry up long ere this.

I notice by one of the latest Mincing Lane, London, reports that 2,500 cases were offered, and realised £125,000, most of these hailing from South Africa. At these sales, which are held at the well-known Mincing Lane Colonial Produce warehouses, special well-lighted floors are set aside for ostrich feathers, and the cases are on exhibit for some days prior to the sale. They are catalogued, and the bidding advances £2 per lb.

As soon as possible after plucking, the feathers should be removed to a well-lighted room and placed on a long table. If the tail feathers are muddy,

it is advisable to wash them carefully under a stream of clean, soft water, but the buyers prefer to purchase *au naturelle*. The various bundles of feathers are taken and tied up in separate bundles, and labelled "cocks," "hens," "tails," "black," or "drabs," respectively, and are placed before the sorter, who is seated at the table. The cocks' white feathers are usually commenced with, and these are separated into four classes, viz., primes, firsts, seconds, thirds, and tipped (feathers with black at the tip). Each of these are again sorted into feathers of the same length and quality, tied up into bundles of 20 or 30 of long ones, and more of the shorter. Byocks, or fancy black and whites, are sorted into firsts and seconds. The hens' wing feathers are sorted into four classes, while light and two shades of dark, and sorted, as with the cocks', into lengths.

All damaged feathers should be tied up into separate bundles, and on no account mixed with the good feathers, as if once this occurs, the particular brand under which they are sold will be absolutely boycotted, and this has kept the trade back in one colony more than anything else. Hens' tails are sorted into four lots—white, light, dark, and damaged; cocks' tails into three lengths with a heap for coloured tails or white with black butts. Blacks and drabs are sorted into long, medium, and short, with two qualities for each. The floss feathers are made up in one lot for each colour. Chicken feathers are sorted into whites, light, and dark, and the drab into long and short. Each lot should be separately tied up, accurately weighed on a balance that one feather will turn, and ticketed with owner's name and a number, also weight of bundle. The whole lot should be properly scheduled on a sheet of paper.

Packing.

The Barbary feathers, which are the best, and fetch the highest prices in the market, reach the home markets packed in camphor-wood, brass-bound, and locked chests, sewn up in cloth or matting. These chests preserve the feathers from the depredations of insects and pilferers. It has always been the custom to send South African feathers in zinc-lined cases, such as drapery is sent in, and these are sewn up in sail-cloth. The Barbary feathers are thicker and contain more floss at the base and tip. Where it takes three or four Australian feathers to make one hat feather, placed one on top of the other, it only requires two Barbary feathers. This is greatly on account of the Australian birds being badly selected in the first instance. Formerly, white feathers fetched the highest prices in the London market, but since a process has been discovered for bleaching paste-coloured and blacks at a small cost, the dyers are indifferent as to colour so long as the quality is there. The expert takes a bundle of feathers in one hand, and presses them with the flat of the other hand. By this means he discovers easily any tipped or broken feathers in a bundle.

I have now concluded the subject with the exception of eaponising and treatment of wounds and diseases, which hardly come within the sphere of the ordinary lay ostrich farmer. All I trust is, that after reading this paper, any person who intends taking up the industry will follow out the lines I have indicated, and I feel sure that success will result. I shall be glad to give any further information on the subject, which I have been long advocating, and to explain through your columns any statement that I have made that perhaps is not thoroughly clear to my readers.

Letter from Mr. MacMillan.

"The subject on which I beg to address you is the importation of ostriches into the State.

"Prior to the year 1870 in South Africa the commercial value of the ostrich was unknown, and the bird was destroyed in an indiscriminate manner. In 1870 feathers to the value of £40,000 were exported; in 1906 the value of feathers exported from Cape Colony was £1,200,000.

"The age to which an ostrich will live is very great, and birds of the known age of 80 are now being plucked.

"The female lays between 30 and 40 eggs in the year, and the young are either produced in the natural way or by incubation.

"The chicks have to be carefully attended to for the first three or four months; after that they can well look after themselves. The birds do not come to maturity until they are about four years of age, when they are plucked.

"After the first plucking they are plucked regularly every eight months. The feathers of a good bird are worth about £6 a plucking.

"The ostrich thrives in the most barren country, requiring little food or water. He is either allowed to roam over wide extents of country in the poor districts, or in the richer districts where the country is divided into small paddocks they are closely farmed.

"A good pair of birds in Cape Colony is worth about £30 to £40, but there is a heavy export duty of £100 on each bird exported and £5 on each egg; but I do not think the same law applies to the Orange River Colony or Transvaal. If, sir, you could see your way clear to establish ostrich farming in this State, there is no doubt before many years had elapsed it would have grown into a great industry. I would respectfully ask you to refer this question for a report to Mr. Le Souef, of the Zoological Gardens. If at any time you might wish the names of firms of standing in the Oudtshoorn district who are interested and have a thorough knowledge of the ostrich business, I would be glad to supply them.

"I must apologise for this crude report (as my facts and figures were handed over to a gentleman who has not troubled to return them), it being written from memory.

"I have, etc.,

"E. C. MACMILLAN."

PUBLICATIONS RECEIVED.

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First Steps in Ampelography (Rutherglen, Vict.).

Statistical Register, Victoria—Production, 1909.

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Statistics of New Zealand, 1907.

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BITTER-PIT IN APPLES.

(GEO. W. WICKENS, Orchard Inspector.)

There is a considerable amount of controversy taking place in Australia at the present time with reference to the cause and possible cure of the disease in apples known as Bitter-pit. I think I am right in saying that no remedy has yet been found, and I have been thinking if orchardists in different portions of this State could be induced to give (either through the *Journal* or direct to Head Office) the results of their observations of the disease in the varying soils and conditions under which apples are grown, it is possible that the accumulated evidence might lead to a solution of the problem. For instance, there are growers who maintain that Bitter-pit is a fungus which can be checked by using Bordeaux mixture: it would be interesting to know what experiments were carried out and on what results their belief is grounded. Personally I have seen Bordeaux repeatedly used, but as yet I cannot claim to noticing any striking beneficial results.

A very common belief with orchardists is that the disease is caused through the trees being planted in wet land, and one continually hears intending planters advised to keep the high land for Cleopatras, Shockleys, Cox's Orange Pippin, and other varieties subject to attack. This is perfectly correct as far as it goes, but I do not believe that the reason why the disease is more prevalent in moist places is generally understood. I have watched Bitter-pit closely for a number of years, and I have always found that when the tree is excessively vigorous and sappy the disease is worst. Young trees, therefore, are worse than old ones, and those growing in low moist land being usually more sappy are worse than those on high dry land. But supposing the tree in the moist land crops heavily and the vigour for that year goes to producing much fruit and little wood, instead of much wood and little fruit, then in that year scarcely any Bitter-pit will be noticeable. And if the tree (assuming it is vigorous) on the high land has only a light crop, the wood for that year will be sappy and abundant, the fruit oversized, inclined to be soft, and badly affected with Bitter-pit.

I have noticed this happen repeatedly both with Cleopatras and Shockleys, particularly Shockleys. This latter variety, which is even much more subject to the disease than Cleopatra, has a habit of cropping heavily one year and lightly the next; the main bulk of the fruit in the heavy year will be small, hard, and fairly free from Bitter-pit; but in the light year when the tree is making big growth the fruit will be large, soft, and almost unsaleable with disease. I was informed last week that an orchardist in this State was sure the disease was caused by pruning, and he based his belief on the fact that close to the cut in the young wood the apples were affected. This appears to me to be only half a truth: for instance, it is noticeable in Rome Beauties that a number of overgrown fruits nearly always set on the buds close to the pruning; but if the tree is thriving and is left unpruned a similar effect will be observed, except that the branches of overgrown apples will be situated on the terminal buds of the young shoots. Frequently with Rome Beauties

FRANCO-BRITISH EXHIBITION.
Western Australian Court.



Entrance to Office and Dome of Pearl-shells.



General View of Western Australian Court.



the over-large apples growing on the previous season's wood are the only specimens to develop the disease, those farther down the tree on the fruit spurs being firm and sound: and this again goes to prove that Bitter-pit is confined mainly to over-sappy wood which produces an over-sized soft fruit.

My belief is that any treatment tending to reduce a too vigorous wood growth and induce regular crops of fruit will prove beneficial; and to this end I would prune all lateral growths in summer, and confine winter pruning to leading shoots only. I cannot remember ever having seen the disease affecting fruit on a stunted, badly grown tree; nor more than slightly affecting those on a thriving tree with medium growth bearing a heavy crop of medium sized fruit.

Another vexed question is, Does the disease spread from affected to sound fruit after storing? I believe that it does not. The trouble being that it is hard to detect while the apple is in its greener stages, but as the fruit ripens the blue-black spots show out plainly. The disease, whether it starts from germ, or spore, or is constitutional, is present in the fruit all the time, maturing as the apple matures.

Last season I had under observation a heap of Shockleys laid out on a storeroom floor to a depth of two feet; about 150 cases in the lot. When these were gathered the apples were well matured, and most of those affected with Bitter-pit could easily be seen. All those showing any traces of the disease were carefully picked out and disposed of at once; the remainder, as I stated above, were put in a heap containing about 150 cases; these were kept until September and October, and only a few cases developed Bitter-pit. Consider the chance the disease had of spreading if it were contagious: the whole of the apples in one heap; the months that elapsed between storing and selling; and the undoubted presence of the disease in the heap all the while. If one apple could affect another, surely the majority in that time would have developed Bitter-pit.

Bridgetown, 22nd February, 1909.

DIE-BACK IN FRUIT TREES.

(T. HOOPER, Chief Inspector of Orchards.)

This disease is affecting orchards in different parts of this State as well as in the Eastern States and America. In the spring certain branches of the trees put forth a few sickly leaves but fail to make any further growth. The tops of these branches eventually wither; strong shoots are then sent out from the base of these branches, and these again in their turn generally wither the next season, hence the name "Die-Back." It has been put down to want of drainage, want of manure, bacteria, etc.

In a letter on the subject the Under Secretary for Agriculture (Mr. Despeissis) states:—

“Thorough drainage is essential. The soil should then have a good liming with from 2 to 6 lbs. of lime per tree, followed with a dressing of:—

½lb. Sulphate of potash,

½lb. Saltpetre,

1lb. Sulphate of iron,

per tree. For matured trees twice the above.

Prune out all diseased parts, taking care to cut to clean healthy buds, and paint cuts with tar. Do not use same seccateurs on healthy trees without first disinfecting them. Spray in winter with Bordeaux Mixture.”

Mr. G. Wickens, Inspector at Bridgetown, remarking on the analysis of certain soil sent from that district on account of Die-Back, says:—

“The analysis, showing that the soil is lacking in plant food, is interesting, because in appearance it seems quite suitable for fruit-growing. Although Die-Back is met with in undrained soils, by far the worst places affected in this district are those planted in the deep, light, well-drained soils on which the original timber was jarrah. It is a class of soil that becomes excessively dry during summer, and I have noticed that when cultivation is not properly attended to for one season only, the disease gains rapidly. As the analysis has proved that the soil is poor in quality, I firmly believe that judicious manuring and constant cultivation, particularly in summer, would go a long way towards successfully combating the disease.”

I have noticed that light powdery soil, whereon jarrah previously grew, is generally where Die-Back is the worst. Analysis of soils, apparently very suitable for fruit-growing, have shown a deficiency in lime, potash, and phosphoric acid. It may be, therefore, that such land had sufficient plant food to support young trees, but that these trees as they grew older naturally required more, yet having used up the available food got less; they therefore become constitutionally weaker. Want of drainage would also produce weak, unhealthy trees. Their branches would, when in that condition, succumb more readily to any bacteria introduced by insects, the use of infected seccateurs, etc. I have seen trees wonderfully improve where the diseased wood has been cut away, the cuts disinfected, and the wood burnt; care being taken to disinfect the shears after each cut and the trees subsequently treated to a little manure.

26th February, 1909.

VALEDICTORY TO MR. J. A. KINSELLA, DAIRY EXPERT.

The Department of Agriculture has suffered a great loss by the departure of Mr. J. A. Kinsella, who has filled with much ability the position of Dairy Expert for a period of nearly two years. Mr. Kinsella has laboured with characteristic energy in his efforts to establish the dairy industry in this State on a modern basis and to inculcate into the farmers the great value of the milch cow. Mr. Kinsella has, however, accepted a responsible position with a private firm in New South Wales and took leave of Western Australia

by the R.M.S. Malwa on the 2nd inst. On the eve of his departure there was a gathering of departmental officers to bid Mr. Kinsella farewell and wish him success in his new sphere.

Mr. A. Despeissis, Under Secretary, speaking for the staff, said all regretted losing the valuable services of Mr. Kinsella, and that the industry had not yet taken sufficient root in the country to encourage him to remain. He gave expression to the cordial goodwill of the officers of the Department towards Mr. Kinsella and the high estimation in which he was held by all who knew him.

Mr. Kinsella expressed his thanks for this evidence of kind regard. He said he had been associated with departments in four different countries and declared that he had never been associated with a better lot of officers. He would always recall with pleasure the period he had spent in Western Australia, and very much regretted he could not remain to co-operate with Professor Lowrie in the work he purposed carrying out.

PROFESSOR LOWRIE WELCOMED.

Mr. Despeissis took advantage of the opportunity to tender, on behalf of the staff, a welcome to the Director, Professor W. Lowrie, and looked forward to the existence of the same sympathetic appreciation as had existed between them and Mr. Kinsella.

Professor Lowrie returned sincere thanks for the hearty manner in which the meeting endorsed the remarks of the Under Secretary. He expressed his own personal regret for the loss of such a man as Mr. Kinsella, whose name as a dairy authority stood above any other throughout Australasia. He testified to the valuable work performed by Mr. Kinsella in New Zealand. He emphasised the existence of zeal and strong individuality in the general work of a service like that of the Department of Agriculture, and expressed the hope that the dairy industry would make such an advance in this State as to recall the great part taken in its foundation by Mr. Kinsella.

"Good-bye" was then said to the departing expert and the meeting terminated.

JUTE CULTIVATION.

In December, 1907, a parcel containing 2lbs. of jute seed (*Corchorus olitorius*) was received from the Superintendent of the Royal Botanic Garden at Calcutta, and portions of the supply were forwarded to Hamel Experiment Station, Beagle Bay Mission Station, and to Mr. Isdell, at Derby, for trial in those several localities.

Mr. Berthoud, manager at Hamel, now reports that he sowed the seed on November 23 last year. The young plants made their appearance fairly by December 1st, and have since made nice healthy growth, being on February 12th about two feet high. Further report of the progress made with the experiment at Hamel will be awaited with interest. If it develops into a successful demonstration, it is possible that it may encourage practical steps being taken to cultivate the plant on a large scale and establish the bag-making industry with locally produced raw material.

SOIL SUBJUGATION IN THE EASTERN STATES.

TREATMENT OF DRY AREAS.

An interesting account is given by Mr. Noel M. Brazier, of Denmark district, of the agricultural developments proceeding in Victoria and South Australia which he recently visited. Mr. Brazier compares the methods adopted in the East with those practised in this State.

Referring to the mallee country in the North-West of Victoria, Mr. Brazier states:—

“In the mallee the first essential is to provide water. Dam-sinking is chiefly in vogue for the use of the settlers who are to be attracted to this region in the future. Some dams are being put down with a capacity of one hundred thousand cubic feet. In the meantime smaller dams are being provided to enable the contractors to get to work on larger public dams. The object is to obviate the effects of the droughts which are a feature of the eleven-inch rainfall area between Ouyen and Pineroo, on the South Australian border. There is absolutely no water save what is obtained by sinking and dam-making. Yet the soil yields some excellent crops. On the South Australian side the Government are putting down bores at intervals, and supplying settlers with hand-boring machines at a minimum of cost. The Victorian Government are also boring at close intervals, and purpose erecting windmills and troughing throughout the mallee.

SILOS.

“The Government there requires the settler to provide the cost of erecting silos in advance, carry the material from the railway station, and give other necessary help. In Western Australia we offer all sorts of assistance, from providing material down to erecting the silo, and only ask for repayment at the end of a term of years, in instalments. Nevertheless, in former times Victoria liberally assisted the farmers in the same direction.

IRRIGATION.

“The only irrigation upon a scale that seemed to me to be suitable to our conditions here is in the vicinity of the flats, close to Adelaide, where the soil is good. Irrigation work is carried on by means of Blackstone oil-engines and centrifugal pumps. The cost of covering the land with four inches of water runs to about 4s. per acre. It is surprising to hear, in view of the experimental irrigation work so successfully being carried out at the Brunswick State Farm, the enormous value of the irrigated land near Adelaide. The rent paid for lucerne land is £6 per acre per annum and for vegetable land £8 per acre per annum. Therefore it is easily perceived that with our splendid flats and numerous rivers in the South-Western Division there should be a glorious future for us here. The irrigated land to which I have referred is not graded, that being rendered unnecessary by the system in use there. Water is conveyed by six-inch galvanised iron piping joined together tem-

porarily with canvas hose, to enable it to be moved wherever required. The farmer who rents ten to fourteen acres is considered to be in a fairly big way.

DEVELOPMENT WORK.

The Heytesbury Forest, which has an area of many thousands of acres, is situated south of Camperdown, and possesses a generous rainfall of over forty inches. It is principally grass-tree plains country, which in Western Australia we would not think of turning to account. Indeed, there was great opposition to the scheme at one time in Victoria. However, they are intersecting it with drains cut ten chains apart. It resembles the plains converging on the 'boggy swamps' of our South-West. Huge traction engines are employed, drawing a big triangle shod with iron for cutting down the blackboys. Afterwards the engine draws disc ploughs through it. They estimate the cost of clearing, ploughing, and digging the drains 10 chains apart at £3 10s. per acre. The soil is moist, and I saw splendid root crops produced from it. We have many thousands of acres of similar land lying idle in our South-West that we do not dream of trying to turn to account. It reminds one of that class of country near Albany, of which a thousand acres many years ago were ploughed by Mr. Powell to a depth of eighteen inches with a steam plough, and then left to produce another crop of scrub thicker than it was originally. The mistake was, of course, that he ploughed too deeply.

FODDER CROPS.

"I was much struck with the strawberry clover I saw in luxuriance at Orbost, in Eastern Gippsland, and also at Tarwin Meadows, in South Gippsland. On this pasture at Orbost they carry one bullock per acre all the year round. At Tarwin Meadows the Messrs. Black Bros. fattened twelve sheep to the acre on one hundred acres for three months, besides using it for the rest of the year. Their sheep topped the Melbourne market. And we have in our own State a vast number of acres of similar country, which would yield similar results. If we were to scatter strawberry clover and birdsfoot trefoil, which grow on any boggy swamps without drainage, of which we have so many thousands of acres on the south coast, in a few years' time, when the swamps are drained, there would be vast quantities of rich feed available for stock grazing on the coast during the early part of winter. These would grow up and spread through the highest rushes, and through everything else. In preparing land for strawberry clover in Gippsland they plough with bullocks and use disc ploughs, harrow, cross-plough and plant with maize. Next year they plant roots of strawberry clover six feet by three feet apart, and within three years it becomes a wonderful mass of succulent and permanent feed.

LAND VALUES.

"I can safely say, as one result of my visit, that our lands are certainly worth many times more than we are accustomed to think they are, and in comparison with what I saw there the prices here should be at least doubled. Considering the generosity and absolute regularity of the rainfall in the South-West, and the depth of our soil, I have returned more confident than ever in the future of this State. In but very few years we shall more than hold our own with the Eastern States. And, by the way, it has become almost

customary for folks to reflect on what they call the patchiness of our lands, as though that were a condition applicable solely to this State. From Cunningham to Orbost, about forty miles, there is some of the very poorest of land it has ever been my lot to see, called stringy bark plains. To go to Tarwin Meadows is a class of soil reminiscent of the Boorabbin sand-plain. Yet we are assured that Gippsland is the garden of Australia. What I wish to point out is that Western Australia has no monopoly of patchy country by any manner of means. On the contrary, I have returned, as I said, more than ever assured of ascendancy in the near future."

FROZEN LAMBS FOR LONDON.

The s.s. "Orient," on her departure from Fremantle on 26th October last, took the first consignment of frozen lambs for the season, consisting of 1,589 carcasses ranging in weight from 42lbs. to 24lbs. Another shipment of 754 lambs was dispatched by the s.s. "China" in the following week.

Every effort had been made by the Department to inculcate the growers with the type of lamb required in London, and they had also the financial results of the previous year's work well before their eyes, and the shipments referred to exhibited a certain degree of improvement. Although in the "Orient" shipment there were, unfortunately, many of the "O" grade, i.e., 28lbs. and under, the result of their reception in the London market carried with it a better lesson than if any restriction had been placed on their acceptance here. The general get-up was in advance of the previous season, and there was not the same multiplicity of small brands.

The following report on the "Orient" consignment from Messrs. Henry S. Fitter & Sons, of Central Markets, London, was forwarded to the Department by the Agent-General:—

"The shipment consisted of three parcels, as under:—1,090 carcasses marked 'Union.' Very fair quality; the larger ones (marked S) were very well matured, but many of the smaller ones were thin and plain in the legs. The condition was generally satisfactory. There are a good many Australian lambs coming to hand, consequently we deemed it advisable to sell without incurring additional storage charges. These realised from 4d. to 4¾d. per lb.

"399 lambs marked C.D.D. The quality of these was hardly so good as the other parcel, and there were a larger percentage of small, thin lambs. The condition, however, was good, and if they could be finished off better they would give better results. These realised from 4¼d. to 4¾d. per lb.

"100 lambs marked J.L.B. Many of these lambs were very fair quality and some nicely finished. Some of the smaller ones, however, were thin and poor. The condition was good, and there would always be a demand for lambs such as these, but to make better prices they would need be somewhat thicker and fatter. These realised 5d. to 5¼d. per lb."

Mr. A. D. Cairns, Manager of the Government Refrigerating Works, Perth, considers the prices realised were good and the shippers to be congratulated, but that they should continue to eliminate weedy, light lambs.

THE ORCHARDS.

CHIEF INSPECTOR'S REPORT.

Mr. T. Hooper, Chief Inspector of Orchards, reports as follows under date February 16, 1909:—

"I beg to report on my recent visit to Mt. Barker, Albany, and Kataning. I inspected some of the principal orchards around Mt. Barker and found the trees in general very clean and the ground well cultivated. Woolly aphis is the worst pest here, but the growers are keeping it in check, so that only an occasional spot could be found in those orchards I visited. The land varies from red loam to light sand with a good clay sub-soil well suited to the culture of the apple and pear. Die-back, which is now puzzling not only this but also many other countries, is also slightly in evidence. The mussel scale, which infects two or three orchards only in this district, is gradually being got under; only a few live scales were to be found.

From Mt. Barker I went to Albany and inspected the one-time Codlin Moth gardens, but saw no signs whatever of the moth.

In Mt. Barker district Mr. H. Warburton (St. Werburgh's) has cleared several paddocks and put them down to couch grass, *paspalum*, etc.; and Mr. A. Muir (Forrest Hill) has carried out extensive experiments with various grasses and fodder plants.

Several growers in this district are contemplating heavy planting of fruit trees during the coming winter."

CORRESPONDENCE.

IMPACTION OF THE STOMACH IN SHEEP.

Mr. Wm. Hodby, of Fair View Farm, Tambellup, writing on 18th February, states:—

"Would you kindly give me a little information to help me. A number of my sheep are suffering with some complaint. They are taken with a gradual stiffness in the limbs and get down in very low condition, and at last lose all power in the hindquarters and get down and cannot raise the hind part. They appear healthy and bright about the eyes. The paddock they run in has plenty dry feed and stinkwood country. I think they live on most fibrous food at this time of the year. It is not caused from poison, as I have never had any poison on the land. The sheep are two-tooth, mixed sexes. I have opened several and find the Bible hard as a stone and filled with dry stuff like yellow sand. If you could give me a cure for it I should be obliged. I think myself it is caused by eating so much dry food."

Mr. T. L. Burns, Government Veterinary Surgeon, replying to the above inquiry, says:—

With reference to the mortality among your sheep, and from the symptoms described, also result of post mortem, I think there is little doubt about

the cause of death, and that impaction of the 3rd stomach (bile) is the cause of it. Now, as regards treatment. Sheep affected in the manner described are very often bad for some time before anything wrong is noticed, and herein is the difficulty of saving them, it being too late as a rule to do anything when the animals are taken in hand.

If you could manage to have the sheep regularly watered from troughs in which a small quantity of magnesium sulphate is dissolved, it would be the best remedy. To advise drenching a large number of sheep would be impracticable and ridiculous.

Of course if it is only an odd animal here and there affected a dose of castor-oil or raw linseed oil with about as much calomel as would go on a threepenny bit might be administered with good results.

The natural herbage at this time of the year being exceptionally dry and often innutritious is the direct cause of a great deal of trouble among stock—cattle as well as sheep.

I shall be pleased to hear from you again later about the sheep, and will endeavour to pay you a visit should you consider such necessary.

OVERFEEDING DUCKLINGS.

Mr. R. Evelyn Wright, of "Candyup," Albany, writes:—

"I have 30 Indian Runner ducklings 13 weeks old. Up to the present they have flourished and ailed nothing. This week they have developed what looks like rickets, tumbling about and almost losing the use of their legs, wobbling their heads about, etc. They have not lost their appetites. Can you inform me what is the cause of this and the cure, if any, as I have another incubatorful coming on and would like to correct any errors I may have made.

"I may say that I have some Rouen and Muscovy ducklings, which have not got this disease, but they are through their moult, and the Runners are not.

"I am feeding them on equal parts of bran, pollard, and oil-cake morning and evening—a bucketful (2 gals.) each feed. Some people say overfed. Is this so? They have had no grain. They are in an open run with abundance of grass and shade, slugs, fruit, etc., but don't forage about much. Lately I have been putting sulphate of iron in their water, but so far no good effects. I hope you can supply me with some remedy or other or point out what I have done wrong."

The Poultry Expert (Mr. Robertson) makes the following reply:—

"The fault in feeding is chiefly too much oil-cake. Give a mash composed chiefly of vegetable food in some form or other, such as boiled cabbages, carrots, turnips, and such like, or finely chopped raw lucerne, rape, barley, or if these are not available, use lucerne chaff, obtainable from Jas. Goss, Hay Street, Perth. Steam it overnight, adding about 1oz. of salt, and animal food (meat meal or blood meal), and sufficient bran and pollard to just bind the mash together. If the pollard is coarse, no bran will be required. Once a week add to mash 2 packets of Epsom salts, and some powdered charcoal. Be sure that ducks always have a good supply of grit and water, also plenty of shade in hot weather. Discontinue the oil-cake at present for the affected

ducks, and feed them lightly as above, and give a good dose of Epsom salts. Kill the most affected ducks, and examine the intestines for worms.

"Under separate cover I am forwarding you a Poultry Pamphlet, with parts relating to Ducks."

POULTRY NOTES.

By FRANK H. ROBERTSON.

HINTS TO BEGINNERS.

To start well in any undertaking is half the battle, and this axiom holds good with poultry-keeping, perhaps, more strongly than in any other matters, and this season of the year presents the most fitting opportunity for making a few remarks on the subject, which are intended as advice particularly to the novice or new beginner. The months of March and April are the two best for making a start for several reasons; firstly, because stock birds can be bought cheaply; they are mostly in bad condition owing to moulting, have ceased laying, and consequently are not profitable to their owners, who have young stock coming on from last season's hatching and the surplus birds are for disposal at low prices. The pullets are kept for egg-production, so their owners are glad to get rid of the old birds. These cast-offs are probably three or four years old and not profitable to the holder for egg-production, but are greatly to be preferred to pullets for breeding from. The novice as a rule buys young birds for his first breeding pens; this is a great mistake, as they cost more to buy and are not so good for breeding from; the old birds are well matured and produce chickens of good stamina. Having now secured a pen of, say, eight second or third season's hens, it is not advisable to mate them to a male bird if they are heavy in moult, but if they have not started to moult, and are laying well, breeding operations can be commenced by mating them to a well-developed young cock or early hatched cockerel in good condition; but should the hens be bare of feathers it is best to suspend breeding operations until they are in full feather. A vigorous cockerel is often a nuisance in a breeding pen when the hens are not laying, and do a considerable amount of damage to the plumage by clawing feathers out of the backs of the hens.

If the mating of breeding pens is left until, say, September or October, suitable stock birds are scarcer owing to regular breeders having got their pens mated up; they have secured the best birds for their own use, and the new breeder has to take a second pick or buy an already mated pen at a considerably advanced price; so it can be seen that there is much to be gained by securing fully matured stock hens early in the season.

As to which is the best kind of birds to start with, whether mongrels, cross-breeds, or pure, would depend on certain conditions. Many persons

start with expensive pure birds of the best quality and give them but little attention. As an instance, I might mention the farmer who had a mongrel lot of poultry running about the farm in the usual haphazard manner, but having been persuaded to invest in a good laying strain White Leghorn cockerel, it was conveyed to the new home in a sugar bag. It was dark on arriving at the farm, so the new cockerel was tossed out of the bag and all forgotten, until some days later it occurred to the farmer that he did not see the new bird running about. Inquiries were made, but no one had even seen the missing bird. A search was made, and he was found under some loose timber close to where he had been let out, dead from starvation, with his legs tied! At another farm I saw on various sheds chalk-written notices, "Don't forget to drive the fowls off the Binder." The explanation of this was that a machinery agent who was requested to examine the binder with the view of effecting repairs complained about having to scrape off so much manure before he could see what was wrong; so the notice was written up as a standing order to the children. Now, with the farmer who is so thoughtless as to turn out a bird with its legs tied, and the other who would not go to the expense of sufficient wire-netting to keep fowls out of the machinery shed, it would not matter what kind of fowls either of them kept; certainly it would be a waste of money for such persons to go to the expense of procuring the best quality of poultry; the scrubbiest mongrels would be good enough, as beyond having some eggs and an occasional fowl for the table nothing more would be looked for; the marketing of birds or eggs as a source of income would never be thought of or considered worth while; besides, if any birds did happen to be sent to the auction rooms the prices realised would be so small as to hardly recoup the sender for the trouble and expense incurred, thus tending to further emphasise the farmer's conviction that there is no profit to be made out of poultry.

On the other hand, presuming that the beginner wishes to make a good start in poultry-keeping for profit, and will work and use his brains a little, the keeping of one, or at most, two pure breeds only is to be preferred. The character of the soil has first to be considered: if the ground is hard and gravelly, keep only light varieties such as the Leghorn, and see that they roost on the low perches, otherwise their feet are likely to suffer severely. But if the soil is well grassed or sandy, any variety can be kept under; but if all feed has to be bought, breeding for egg-production will pay best; therefore obtain stock birds of good laying strains of White or Brown Leghorns, or Minorcas. On the other hand, if on a farm where grain is grown, go in for an all-round breed such as Orpingtons, Wyandottes, or Plymouth Rocks, thus is obtained a fair layer and birds which sell well for the table. Start with unmated male and female birds, and for fresh stock birds for the ensuing season buy during August one or two sittings of a different strain of the same breed for the purpose of breeding your fresh stock birds for mating to your own birds during the following season; and as a means of identification cut a small snip out of the web of the foot as soon as the chickens are hatched, which can be done with a pair of scissors, or small chicken punches are obtainable for this purpose.

Three or four breeding pens are required for keeping separate the stock birds during the breeding season; a suitable size would be each, say, 20ft. x 40ft. A separate pen is also required for the cockerels, of $\frac{1}{4}$ to $\frac{1}{2}$ an acre according to the number of birds to be reared, as it is necessary to keep cock-

erels from running with hens or pullets. There will be but little fighting among cockerels if they are handled judiciously, in this way: suppose there is a mob of 30 early hatched cockerels in the run, if another mob of about an equal number is turned into the same pen there will be a general *mêlée*, but not much serious damage occurs, as the fighting is spasmodic and does not last long; but if only one or two cockerels are turned into an established run, the new-comers are very liable to be killed, or cowed so much that they receive a bad set-back.

A few movable coops with wire-netted runs attached should be made; these are necessary for many purposes, such as for chicken rearing, temporary abode for sick or quarrelsome birds, for fattening, for a quarantine for newly bought birds, for knocking off broodiness in hens, and many other purposes. The runs should be erected where there is a good tree shelter, and on an easterly slope for preference; hard stony ground is unsuitable, also hard ground with a top of sharp gravel; also avoid a bleak aspect where the birds would be exposed to the full force of cold winds.

Farmers frequently make the remark that they have tried keeping fowls in runs but did not make a success of it: the birds fly out, or get diseased, or do not lay well. All these troubles are owing to want of attention. One wing should be cut to prevent flying, and they must be fed carefully and regularly with a proper egg-producing diet; if not, they will get too fat. They want as much greenstuff as they can eat all the year round, some animal food, grit, clean water, places to dust in, and the fowlhouse itself, particularly the perches, kept free of lice. The details of above are obtainable from the Poultry Pamphlet issued by this Department free on application.

THE EGG-LAYING COMPETITION.

Ere these notes appear, the new Competitions will have commenced. The chief alterations are that the new one will be for the full 12 months, for both fowls and ducks. Prizes are to be given for the birds producing the greatest market value of eggs, and in the fowl-pens the cocks are to be removed after the 1st December.

The duck runs will be re-erected on fresh ground, and the old location dug over and sown with rape.

At time of writing the birds now completing their nine months' laying are looking bright and healthy, many of course are very ragged. It is remarkable to note the vagaries of poultry during the moulting period; there is not much difference in the ages of the birds, and they are all fed and housed alike, yet we notice some get very bare of feathers and quickly grow a fresh coat; others have not lost a single feather; and again, some have a gradual and almost imperceptible moult, while quietly casting the old feathers the new ones gradually appear. At the same time, the system is not disturbed while this rejuvenation is proceeding, the combs remain red and the output of eggs keeps up; birds of this sort are of the persistent laying type that, as a rule, are high up in the egg records. One thing is, however, noticeable, and that is that both cocks and drakes are earlier moulters than hens or ducks.

THIRD EGG-LAYING COMPETITION AT SUBIACO.

[Commenced July 1, 1908. To close March 31, 1909.]

Appended, herewith, are the results for the competition which commenced on the 1st July and is to run for nine months, terminating on the 31st instant.

Eggs for sitting from any of the pens are obtainable on application to the Manager at Subiaco; prices range from 10s. 6d. to 21s. per dozen. A price list is forwarded on application, or see the *Journal* for July.

The following are the results up to February 28 :—

The figures in black indicate the winner of the monthly prize.

The first column of figures indicates the present position of the pens in the competition.

Pens marked thus * remained in from last competition.

FOWLS.

Six females and one male bird in each pen.

Owner and Breed.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Total
1 Mrs. A. S. Craig, Black Orpington ...	131	145	129	146	110	117	122	111	1011
2 S. Craig, White Leghorn ...	81	126	133	144	135	137	129	115	1000
3 Mrs. C. F. Schmidt, White Leghorn ...	104	117	127	131	128	134	123	87	951
4 Sunnyhurst (S.A.), White Leghorn ...	109	111	143	143	111	100	133	101	948
5 A. H. Padman (S.A.), White Leghorn ...	71	124	146	137	127	120	122	95	945
6 Gaffney & Bach, White Leghorn ...	102	117	128	136	113	125	118	102	941
7 Mrs. A. E. Kinnear (S.A.), White Leghorn ...	82	110	136	140	121	112	118	105	924
8 Mrs. Kynaston, White Leghorn ...	91	130	122	139	108	104	112	103	909
9 C. Herbert, White Leghorn ...	86	129	133	129	91	106	123	108	905
10 Mrs. L. Mellen, White Leghorn ...	106	126	133	128	92	83	117	108	893
11 A. M. Thomas, White Leghorn ...	77	133	132	133	70	105	124	112	886
12 Homebush Farm, White Leghorn ...	80	107	118	135	121	102	118	97	878
13 T. W. Martin, White Leghorn ...	76	126	131	129	89	110	118	96	875
14 Lionhurst Poultry Farm, Buff Leghorn ...	104	116	121	132	99	98	108	96	874
15 C. B. Bertelsmier (S.A.), W. Leghorn ...	94	125	121	121	82	100	132	88	863
16 Paddy King & Salter, White Leghorn ...	95	101	105	108	104	109	119	117	858
17 Greenville Poultry Farm, White Leghorn ...	97	114	127	118	87	106	121	83	853
18 G. Bolger, White Leghorn ...	49	115	138	139	105	105	110	91	852
19 Shanrock Poultry Farm, White Leghorn ...	82	99	133	131	78	97	121	111	852
20 T. Ockerby, White Leghorn ...	62	126	116	129	111	115	97	86	842
21 J. W. Buttsworth, White Leghorn ...	113	133	117	113	78	91	118	76	839
22 Glendonald Poultry Yard, Silver Wyandotte ...	92	117	129	125	99	96	100	77	835
23 R. G. Flynn, White Leghorn ...	86	92	88	101	104	106	128	108	813
24 W. Elliot, White Leghorn ...	89	109	109	114	88	103	104	95	811
25 Bon Accord Poultry Yard, W. Leghorn ...	94	119	102	116	79	98	110	92	810
26 Mrs. Hopley, White Leghorn ...	87	118	111	110	80	91	10	95	802
27 E. Garbett, White Leghorn ...	71	129	120	120	85	88	104	79	796
28 Mrs. Younger, White Leghorn ...	41	97	121	126	103	97	110	91	786
29 J. Gaffney, White Leghorn ...	83	106	119	112	102	98	87	70	777
30 Mrs. Flynn, White Leghorn ...	78	94	114	111	90	101	105	81	774
31 Ontario (S.A.) White Leghorn ...	72	82	106	140	75	94	113	88	770
32 Coolgardie3 Poultry Farm, W. Leghorn ...	66	97	110	112	96	92	93	94	760
33 Honner and Forbes, R.C. White Leghorn ...	69	99	111	114	85	85	100	86	749
34 J. R. De Morrison, White Leghorn ...	61	104	108	105	82	90	104	86	740
35 Greenville Poultry Farm, Silver Wyandotte ...	105	97	107	110	88	76	85	70	738
36 Mrs. Hughes, White Leghorn ...	57	92	126	116	75	73	111	87	737
37 O.K. Poultry Yards, White Leghorn ...	34	106	119	115	92	101	105	64	736
38 *J. D. Wilson, Brown Leghorn ...	42	84	110	117	104	89	111	79	736
39 *White Wings P.F. (No. 2), White Leghorn ...	71	93	103	111	63	85	104	91	721
40 The Elmus Poultry Yard, White Leghorn ...	51	92	111	124	96	86	92	61	713

EGG-LAYING COMPETITION—continued.

FOWLS—continued.

Owner and Breed.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Total.
41 *T. W. Martin (late O. James), White Leghorn	62	104	114	93	76	88	87	88	712
42 Devine & Migro, White Leghorn	58	94	115	121	100	63	99	51	701
43 A. E. Champness, White Leghorn	40	108	109	110	76	81	94	80	698
44 *Craig Bros. (No. 1), White Leghorn	30	93	88	103	81	74	118	106	693
45 Adelaide Poultry Farm, Buff Leghorn	33	82	104	106	87	85	86	80	683
46 G. George, White Leghorn	66	96	103	106	85	79	77	69	681
47 Mrs. McGree (No. 2), White Wyandotte	40	90	108	81	94	86	92	89	680
48 T. Hickey, White Leghorn	0	84	130	102	64	99	120	80	679
49 South Perth Poultry Farm, R.C. White Leghorn	61	91	92	108	87	79	90	65	673
50 Craig Bros., Black Orpington	70	97	90	121	96	69	76	53	672
51 *Adelaide Poultry Yard, R.C. Brown Leghorn	62	99	106	96	74	84	82	71	654
52 *White Wings Poultry Farm (No. 1), White Leghorn	52	65	80	96	85	75	84	93	630
53 *Mrs. McGree (No. 1), White Wyandotte	49	107	91	99	59	70	87	67	629
54 F. Whitfield, Minorca	57	71	89	122	83	76	73	57	628
55 Hillview Poultry Farm, White Leghorn	51	92	83	89	81	79	79	54	608
56 *J. Stuart, Golden Wyandotte	69	101	99	103	77	51	41	40	581
57 *J. Stuart, Silver-pencilled Wyandotte	33	74	101	94	77	60	55	52	546
58 *Mrs. H. M. Kelley, White Leghorn	23	68	106	104	60	61	48	49	519
59 Craig Bros. (S.A.) (No. 2), W. Leghorn	49	81	90	88	61	49	61	39	518
60 *Mrs. H. M. Kelley, Gold Wyandotte	33	85	96	92	76	65	44	21	512
61 R. L. Martin, Black Orpington	95	84	69	62	71	41	56	51	493
62 J. Stuart, S.L. Wyandotte	57	72	83	62	79	58	46	35	492
63 Craig Bros., White Orpington	57	73	60	67	48	54	43	44	446
64 J. Miller (late Dobson), Silver Wyandotte	34	59	40	38	36	34	25	32	298

Winner of first monthly prize, Mrs. A. S. Craig, Black Orpingtons, 131 eggs; second month, Mrs. A. S. Craig, 145 eggs; third month, A. H. Padman, White Leghorn, 146 eggs; fourth month, Mrs. Craig, Black Orpingtons, 146 eggs; fifth month, S. Craig, White Leghorns, 135 eggs; sixth month, S. Craig, White Leghorns, 137 eggs; seventh month, Sunnyhurst White Leghorns, 133 eggs; eighth month, Paddy King and Salter's White Leghorns, 117 eggs.

Winner of first three months test, Mrs. A. S. Craig, Black Orpingtons, 405 eggs.

DUCKS.

Six ducks and one drake in each pen.

Owner and breed.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Total.
1 F. Whitfield, Indian Runner	106	148	146	156	132	128	109	63	988
2 *G. Thomson, Indian Runner	131	135	150	142	131	100	88	94	971
3 C. Phillips, Indian Runner	101	117	144	150	140	128	99	91	970
4 *Smith & Davenport, Indian Runner	116	128	136	154	125	99	105	86	949
5 *Mrs. L. Mellen, Indian Runner	131	141	154	149	101	95	86	90	947
6 C. W. Johnston, Indian Runner	24	26	120	165	177	143	155	101	911
7 J. Robertson, Indian Runner	32	108	179	143	139	119	102	78	900
8 White Wings Poultry Farm, Buff	114	177	162	166	63	101	74	15	872
9 D. F. Vincent, Indian Runner	119	132	133	177	123	64	57	42	847
10 *South Perth Poultry Farm (No. 2), Pekin	7	116	160	147	116	120	106	37	809
11 A. W. Edgar, Indian Runner	12	96	149	152	127	123	103	45	807
12 C. Geddes, Indian Runner	89	134	134	135	70	92	92	59	805
13 H. Carr and Son, Indian Runner	142	137	136	118	95	72	43	47	790
14 Mrs. R. B. Moyle, Indian Runner	132	127	92	113	84	74	92	54	768
15 Bon Accord Poultry Yard, Buff	54	86	132	137	110	106	75	43	743
16 Simplex Incubator Factory, White Indian Runner	4	9	109	162	94	125	122	118	743
17 Grenville Poultry Farm, Ind. Runner	68	85	140	128	47	98	92	66	724

EGG-LAYING COMPETITION—*continued.*DUCKS—*continued.*

Owner and Breed.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Total.
18 *F. Whitfield (late Dusting), Indian Runner	72	48	108	128	127	71	84	64	702
19 J. Moyle, Indian Runner	114	115	137	102	90	39	52	37	686
20 Coolgardie Poultry Farm, Pekin	0	40	143	106	127	118	99	23	656
21 South Perth Poultry Farm (No. 1), Pekin	0	50	137	145	139	100	69	6	646
22 Adelaide Poultry Yard, Indian Runner	49	105	122	124	91	81	58	15	645

Winner of first monthly prize, H. Carr and Sons, Indian Runners, 142 eggs; second month, White Wings Poultry Farm, Buff Orpingtons, 177 eggs; third month, J. Robertson, Indian Runners, 179 eggs; fourth month, D. F. Vincent, Indian Runners, 177 eggs; fifth month, C. W. Johnson, Indian Runners, 177 eggs; sixth month, C. W. Johnson, Indian Runner, 143 eggs; seventh month, C. W. Johnson, Indian Runners, 155 eggs; eighth month, Simplex Factory, White Indian Runners, 118 eggs.

Winner of first three months' test, White Wings Poultry Farm, Buff Orpingtons 453 eggs.

SECOND YEAR'S TEST—FOWLS.

1 Craig Bros.' No. 1, White Leghorn	30	93	88	103	81	74	118	106	1,988
2 J. Stuart, Golden Wyandotte	69	101	99	103	77	51	41	40	1,981
3 J. D. Wilson, Brown Leghorn	42	84	110	117	104	89	111	79	1,861
4 Mrs. McGree, No. 1, W. Wyandotte	49	107	91	99	59	70	87	67	1,817
5 T. W. Martin (late James), White Leghorn	62	104	114	93	76	88	87	88	1,787
6 Adelaide Poultry Yard, R.C. Brown Leghorn	62	99	106	96	74	84	82	80	1,732
7 Mrs. Kelley, Golden Wyandotte	33	85	96	92	76	65	44	21	1,631
8 White Wings Poultry Yard No. 1, White Leghorn	52	65	80	96	85	75	84	93	1,525
9 J. Stuart, Silver-pen. Wyandotte	33	74	101	94	77	60	55	52	1,471
10 J. Miller (late Dobson), Silver Wyandotte	34	59	40	38	36	34	25	32	1,331
11 Mrs. Kelley, White Leghorn	23	68	106	104	60	61	48	49	1,329

SECOND YEAR'S TEST—DUCKS.

	First year.	July.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Total.
1 G. Thomson, Indian Runner ...	1,571	131	135	150	142	131	100	88	94	2,542
2 Smith and Davenport, Indian Runner	1,333	116	128	136	154	125	99	105	86	2,282
3 F. Whitfield (late Dusting), Indian Runner	1,493	72	48	108	128	127	77	84	64	2,195
4 Mrs. L. Mellen, Indian Runner ...	1,244	131	141	154	149	101	95	86	90	2,191
5 South Perth No. 2, Pekin	840	7	116	160	147	116	120	106	37	1,649

WESTERN AUSTRALIAN ORCHARDS.

We are indebted to the *Newcastle Herald* for the following interesting description of some of our most prominent orchards. They afford striking illustration of the unique capabilities of this State and its climate for an extensive industry in fruit production, and its accompaniment, wine-making. Indeed, the vineyards under review have led the way in the manufacture of wines possessing purity and quality, which have won for them distinction in competition with vintages of older countries.

Toodyay has quite a number of very fine orchards and vineyards, and may be regarded as one of the best fruit-growing districts in the State.

Coorinja.

Taking first Coorinja, of which Mr. J. J. Valent is manager, the following particulars were gleaned:—

The property is about 16 years old, and has been in possession of the present owners—an English company—for the past ten years. There are, approximately, 350 acres, 80 of which are under cultivation, consisting of trees and vines.

On entering the cellar one is struck with the size of two immense vats on either side of the entrance. They are constructed of American pine, and the wood used in the construction of one of these weighed two tons, the cost being £90 respectively. The vats were full, and each contained 3,500 gallons of wine. The manager intends having a 5,000 gallon vat constructed of oak, and it will probably cost £180; the staves will be 15ft. long and 3in. in thickness.

There is an abundant supply of water on the property, a flow continually issuing from the ground in a cutting of the railway which runs through the orchard. The fermenting room is upstairs where a large Forwood, Down & Co. press is fitted. The capacity of this in one application is 250 gallons of grape juice. The Mabbile Freres crusher is a machine worked by hand; and the grapes on the bunch pass through two corrugated rollers, after which a series of revolving beaters separate the stalk from the husk. The stalks are caught in an endless screw, whilst the husk and juice of the grape pass into a vat on the next floor. When this vat is filled the machine is moved over another vat, and the process continues.

The grapes grown on Coorinja are mostly the principal wine grapes, including the claret varieties, Carbernet Malbee, and Shiraz; the Grenache for port. There is at present in the cellar, approximately, 35,000 gallons of wine up to nine years of age. The cellars are divided into three sections, viz., crushing room, fermenting room, and maturing rooms in the basement. The yields for the past couple of years have been seriously affected by the seasons, which from a grower's standpoint have not been at all favourable. The heat wave at Christmas time had a particularly bad effect on the fruit, which in some cases was literally burned off the vines.

Key Farm.

Key Farm, another of Mr. A. N. Piesse's orchards, is perhaps 60 years old, and the pear and fig trees in the old garden have been dumb witnesses of

the events of the past half-century, and their large-girthed trunks still bear every appearance of health and fertility. It is now some eight years since Mr. Piesse took over the old place, but in this remarkably short space of time the transformation has been remarkable, and the visitor at once forms the impression that the owner must be a person whose policy is system. On a hot summer's day there is nothing more annoying than the opening of gates. With these gates there is no shoving, dragging, and so on. The visitor, without leaving his seat, opens the gate by the "pull the string and the figure works" principle. It is known as the McNeil-Carter automatic gate, and is easily made to open and close merely by pulling a line. A well-gravelled drive brings one to the residence, nicely situated by the brook. The fruit trees consist of all the best marketable varieties, and we have never seen a collection of trees with a more beautifully healthy appearance than these. The soil is a dark loam, and is worked to a fine tilth by means of the Morgan's spading harrow. There are thirty-five acres under crop, and fruits are obtained from the orchard all the year round except in the month of November. This is due to the fact that the district is in the temperate climate, and there is no doubt that fruits can be grown right throughout the year. The district, in Mr. Piesse's opinion, is particularly adapted for the production of Navel oranges. We noticed a group of three-year-old orange trees, and they were a perfect picture, showing remarkable development. Mr. Piesse intends installing an irrigation plant, and has erected a "Samson" windmill for the purpose. The time is coming when to grow fruit successfully growers will have to irrigate. Mr. Piesse has plenty of good water, and there are several pools in the brook which winds through the property.

Key Farm is an object lesson to anyone desirous of knowing what can be done in a few years by the application of energy, system, and common sense. We do not know of anyone who could provide a better training for young men about to go in for fruit-growing on commercial lines than Mr. A. N. Piesse, and we have no hesitation in saying that if half the people who enter the industry exercised the care and discretion of Mr. Piesse this State would out-rival any of the other States in a remarkably short space of time.

Strathavon.

"Strathavon," the property of Mr. W. H. Strahan, is situated about four miles west from Newcastle. Mr. Strahan is a practical man, and his earlier experiences in the growing of fruit were rather hard, but to-day he has 25 or 30 acres of the finest orchard one could wish to see. As one gains the top of a hill overlooking the property, a most magnificent picture of the green, symmetrical lines of fruit trees and a soil of chocolate colour a few hundred feet below is presented to the gaze. It is about 15 years since Mr. Strahan commenced operations, and at the present day he has fruit practically all the year round. The peaches, grapes, etc., were of splendid size and excellent flavour, and the apple crop gives great promise; the trees in many instances being lowered to the ground with the weight of the crop.

Like Mr. Piesse, Mr. Strahan realises the important part which irrigation is to take in the production of fruit. At much expense and with considerable labour he has constructed a dam in the bed of the valley, which, when full, will be capable of holding back 500,000 gallons of water. He has pipes connected with the low-lying portions of the orchard, and has excavated a tank on an eminence to the right to which he intends, by means of a wind-

FRANCO-BRITISH EXHIBITION.
Western Australian Court.



Mineral Section.



Showing Apple and Pearl-shell Trophy.

mill, pumping the water, and from whence he will irrigate the whole of the garden. This is intensely interesting, and if Mr. Strahan is successful, as he richly deserves to be, will have demonstrated that he is something of an engineer. The scheme is by no means an elementary one, and when completed will furnish one of the finest orchards in the district with a plentiful water supply.

CAPE BARLEY FOR FORAGE.

Replying to a Kellerberrin settler inquiring as to the best forage crops for winter and early spring green feed, and also asking for a comparison of the value of English and Cape barley for that purpose, the Director of Agriculture (Professor Wm. Lowrie) writes as follows:—

“In the first place I would say I am thoroughly assured that you will in each and every time find that the Cape barley is more valuable to sow for forage. It stools better and stands stocking better than the English barley, and has a further advantage that the seed is generally cheaper, while it also yields a bulk of forage considerably greater.

“Cape barley is one of the earliest feeds that could be grown and compares well with varieties of oats that are used for that purpose in its stock-carrying capacity.

“In New Zealand I preferred Dunn oats to Cape barley, but the former must be sown with the very first rains, as it grows till mid-winter very slowly, occupying the time in stooling. In the early spring, however, it will stand much more feeding than will Cape barley, as it grows like a tussocky grass and keeps on shooting as it is grazed by the stock. It is just possible, however—indeed, I think it probable—that in your district the rainfall is not sufficient to get good results from Dunn oats, and if you try that variety I would suggest that you sow only a small block of it to prove the position for yourself. In a wetter climate I know that Italian rye grass (especially Sutton's Giant Italian) will carry more than double the stock of either of these forages.

“I have again and again had small areas of Cape barley and Italian rye grass for winter feed, and have found that the Italian grass carries stock much later into the season and carries a much greater number of them. If the Italian rye grass be sown in the spring and be allowed to run to seed you will find that it will tend to seed itself; but your rainfall, I would say again, is too low, I fear, to do much with Italian rye grass, though, as in the case of Dunn oats, I would advise you to try a small block of it for your own satisfaction.

“You should sow Cape barley thickly, and if you sow Italian rye grass, sow at least 30lbs. to the acre. Have you tried White Mustard mixed with Cape barley? If not, 5 or 6 lbs. to the acre mixed on a small part of the block would be worth your while to try.”

HOUSE-BUILDING IN THE BACK BLOCKS.

(By J. M. BRAND, *S. A. Journal.*)

The house I would recommend is built with what is known as the adobe wall. For appearance, solidity, and cheapness it is hard to beat. The walls consist of earth of a loamy nature—about half-way between clay and sand. The material is procurable in almost any district, and is taken from the surface for about a foot deep. This earth is damped over night for the next day's use, and the whole secret of success lies in the damping. It must all be made damp, and not wet, care being taken not to have any dry lumps in it. A layer of this earth is placed loose between boards, distributed equally, and then rammed with an ordinary floor-rammer until you can make no further impression on it; then another layer is put in, and so on.

When the first boards are taken off the wall is so solid that you can place the boards on top as soon as you have finished one set, and ram away again. When the wall is finished and dry it should be oiled with boiled oil, and you then have a structure that will almost resist a nail being driven into it. All the outlay, with the exception of labour, is for lintels, wallplate, bolts, and oil.

All the plant required—and this could be bought collectively or lent by the Government—consists of four boards, 18in. by $1\frac{1}{2}$ in., and say 12ft. long, cut square on the ends, so that when the boards are level the corners are upright. Providing you start square and level and fill the space between the boards each time the wall must go up square and level. Two of the boards should be longer than the other two by the width of the wall, so as to bring the ends level. You also want ten bolts, long enough to go through the wall and the boards, made of $\frac{1}{2}$ -inch iron with square heads and furnished with a point, so as not to damage the thread when knocking them out. These bolts go through the boards and rest on the wall. For the top of the boards clamps are used, which are made of 1-inch by $\frac{1}{2}$ -inch flat iron, and are dropped over the boards. When the layer is finished they are simply knocked up, the bolts are withdrawn, and the bolt-holes filled at the ends.

The boards are held together at the corners on the outside by means of four pieces of iron, and the inside boards are rabbited. The boards should have holes pierced along both sides every 3ft. at a distance of 3in. from the edge, so as to allow them to overlap the wall, and should be screwed up tightly. It is necessary to have two boards made the width of the wall and cut square to place at the end of the long boards, or at any of the bolt-holes to cut the joints in the wall. It is a good plan to put tar on the foundation to prevent damp from rising.

There are several houses of this kind in Renmark, some of them fourteen years old. Under ordinary circumstances it takes two men three weeks to put up two rooms 15ft. x 15ft. and 9ft. high, with a 15-inch wall.

AUSTRALIAN HORSES FOR INDIA.

ARE THE WALERS DETERIORATING?

(Live Stock Journal.)

The Australian horse has in recent years been subjected to a lot of criticism from leading Army authorities. Again and again in the past decade it has been declared that Australian horses of the class suitable for export are deteriorating.

The question is of importance not only to Australia, where the trade in horses is an important industry, but also to the Indian Government, which has for a long time been a big buyer of "walers." No horses are so well and so popularly known in India. The waler has stood the rigours of the trying Eastern climate in an extraordinary manner. Moreover, Australia is handy to India, and the cost of transport is light. If the Australian horse is really losing quality, it is a bad thing for both India and the Commonwealth.

But despite the emphatic assertion of the military authorities, the case against the waler is far from proved. Australian breeders and dealers absolutely deny the charge; in fact, they treat it good-humouredly. They say, "The Indian Government does not like the rise in the prices of horseflesh, and is attempting to 'bear' the market. But if our horses are too dear for the Indian buyers, let them go elsewhere. We find plenty who are willing to show their appreciation of walers by paying us current values. We will deal with them."

In short, to everyone in Australia, except the Indian buyers, the Australian horse is as good to-day as it ever was, if not better. Nothing has occurred to bring about its deterioration. The stock from which the animals are bred has not changed suddenly in the past ten years. And it is within ten years or less that the talk of deterioration has sprung up. If the quality of the horses of the Commonwealth has altered at all in the past ten years, it should be for the better, for in Australia, as in every young country where keen stock-breeders are at work and fresh blood is always being infused, the tendency is to improve steadily. Australia is, above all things, a horse-loving country. And it loves a good horse. An Australian farmer may have disreputable fences and outbuildings, but he will, if he can possibly finance it, be carried by a horse of quality.

The Australian breeder makes out a good case against the charge of deterioration. He points out that when horses were cheap India was satisfied and the critics silent. Because £20 will not buy the same stamp of horse now as it would fifteen years ago does not prove that horses have fallen off in quality. It merely establishes that they have gone up in value. And that is what has happened in Australia. Prior to the South African war Australia had practically only one outlet for her surplus horses—India. Indian buyers controlled the trade. They took what they liked, and left what they did not like. They set the value of horses suited for Army purposes. And the Army was very fair in its way. It fixed a price based upon world's values, and a

price which was deemed payable to the Australian breeder. The trade flourished. At that time sheep and cattle in Australia were also cheap, and horse-breeding paid as well as anything else.

But a change came with the African war. The demand for Australian horses was prodigious. Tens of thousands of remounts left the country in two or three years. Prices went up with a bound. Any sort of sound, active animal fetched a higher figure than could be obtained a couple of years before for the most superior walers. Australia was drained of its surplus stock. Lots of rubbish found a place in the transports. There followed a brief lull, although India was always an active buyer, and was already finding its bids insufficient to obtain the superior horses of a few years before. Then came the Japanese war with Russia, and in a few months Japanese officers rushed through Australia and snapped up 10,000 animals at prices which a few years earlier would have appeared prodigious.

And these sudden calls were not transitory. The trade with South Africa has been considerable since the war, and promises well for the future. Java is buying freely in the Commonwealth, and the German Government is also in the field. The Australian breeder no longer looks to India as his only buyer. And, although India was a good friend in the past, he is not disposed to make concessions. If India was a good buyer, Australia provided a good horse. There was no sentiment on India's part; there shall be none on the part of Australia now. If India wants Australian horses, her Government must be prepared to outbid other buyers.

So far India has not moved with the times. The Remount Department has failed to recognise that all the world over horses suited for Army work have become more valuable. Instead, it sends so much money to Australia and expects to get the same number of horses of the same quality as that amount purchased a few years ago. When a batch of inferior animals is sent up, the officers declare there has been deterioration. The trouble is not with the Australian horse, but with the demand that has sprung up for it.

Sometimes it is contended that Australia has been drained of its horses, and that its mares have been sacrificed too freely for the tempting prices. But these contentions will not stand investigation. Between 1900 and 1907 the horses in the Commonwealth increased from 1,609,000 to 1,765,000. And good as have been the prices, they have not been good enough to make men sell their breeders. Even if they had been there would not yet have been time for this ill-considered action to explain the alleged loss of quality. As a matter of fact, the higher prices have been an incentive to higher quality. Owners have had the encouragement and the means to purchase better sires, and it has paid them better than ever before to put the best mares they could produce to the stud.

Sheep and cattle are now so profitable in Australia that horses are not likely to become suddenly cheaper. Any indications of a fall in values would at once be attended by less breeding. Even at present rates it is very doubtful if horses pay as well as the growing of wool and mutton and beef. Returns from horse-breeding are slow, and the risks are heavier than with the other animals. Too much value is shut up in one animal, and the blemish which might any day befall a high-spirited colt and spoil his sale would, even if incurred, be of little moment to a steer or a heifer. But still, horse-breed-

ing will always be an important industry in Australia. The pastoralist will continue to raise large numbers, and the farmers, who are now so rapidly on the increase, will always be active breeders.

The Australian Army horse is almost invariably a cross. The "Remount" sire has never become very popular. Australian horse-breeders are very decided in their liking for the thoroughbred. All over the Continent you will find blood stallions at the head of a most miscellaneous lot of mares. You will find imported horses boasting the most aristocratic of British pedigrees being mated with dams just as well bred, in the hope of getting gallopers, and you will also find them siring the best of walers from mares in which there is a strong dash of the Clydesdale. Doubtless this accounts for the reputation of the walers; they are all well supplied with the stoutest blood and proudest spirit in the world. It is very common in Australia for a man to give £500 or £1,000 for a young thoroughbred sire intended to breed horses for the export trade. This adherence to racing stallions leads, of course, to the use of many "weeds," but it has its compensations. It produces some bad shapes, but seldom a faint heart.

In recent years the Australians have been importing trotting sires from America for the breeding of harness horses, and trotting is becoming very popular. But the trotter is not likely to interfere with the supremacy of the thoroughbred. Welsh pony sires are also in great demand, and, crossed with big, roomy mares, are producing very saleable animals. Draught horses are, in consequence of the spread of the farming movement, making a very decided advance in quality. All round, in fact, the Australian horse appears to be on the up grade; and when the Imperial authorities get tired of cheap stuff they will find the Commonwealth quite ready to send to India horses equal, if not superior, to those which a few years ago made so good a name for the waler.

BACTERIA.

(Mark Lane Express Agricultural Journal.)

Bacteria are unicellular organisms, the most lowly-organised members of the vegetable kingdom. The word unicellular may be more fully explained. Everything living, animal or vegetable, is made up of cells or the product of cells—just as a brick wall is made up of individual bricks. As the brick is the structural unit of the wall so is the cell the physiological unit of the living structure. The difference between the cells of highly-organised animals and those of unicellular creatures is that, in the former case, different groups of cells take on special functions: one group digestion, another sensation, etc., while obviously the single cell—of which the unicellular creature is composed

—has itself to carry out all the functions necessary to its existence. Bacteria, then, consist of a single cell, and they are considered to belong to the vegetable kingdom.

They exist in three fundamental shapes:—

1. The simplest possible, a sphere or ball. These spheres, each known as a "coccus," may remain quite separate or may be grouped together in various ways—in pairs, clumps, or chains.

2. Elongated or rod-shaped structures, what is properly referred to as a "bacillus." This may be of various degrees of elongation from an oval to almost a thin filament.

3. The rod may be curved or spiral, forming what is called a spirillum.

They are very minute. We can hardly realise how much so. On the average it would take about 15,000 of them to stretch the length of an inch.

They live by taking fluids into their substance and extracting from them what they require for their nutriment; thus they must be in at least a moist environment, and in the absence of moisture bacterial activity ceases. They also form substances known as ferments just as do the higher animals. We are familiar with those formed by the latter, as pepsin, rennet, etc. The function of these ferments is to modify organic substances so as to render them assimilable or directly fit for food for bacteria. It is in the performance of this function of assimilation that they are such a powerful force in Nature; their food is always dead organic matter of some sort.

Their method of reproduction may be referred to as of general importance. When bacteria find themselves under congenial conditions with plenty of food material they proceed to multiply. This is for the most part a simple process of fission or division, the structure simply divides into two parts, each similar to the parent. Under favourable conditions this process is repeated by the new individuals in from 20 to 60 minutes, so that it will be seen at once that multiplication is a marvellously rapid process with bacteria; for, obviously, starting with one individual, at the end of an hour there will be two; at the end of another hour four; at the end of another hour eight, and so on till at the end of twenty-four hours it is 16,000,000. As a matter of fact conditions hardly ever allow of such increase under natural circumstances, though it probably often occurs under laboratory conditions, which are very different.

SPEAR GRASS COUNTRY—TRANS-AUSTRALIAN RAILWAY ROUTE.

Mr. R. J. Anketell, chief surveyor of the Western Australian section of the Trans-Australian railway, has forwarded a specimen of spear grass which was obtained near Madone during the recent survey by his party. The grass is reported to be luxuriant in that district and that on all sides of the same locality there are "hundreds of thousands of acres" of country similarly grassed. The bunch referred to was from 33 to 36 inches in height.

The specimen is recognised as the *Stipa Drummondii*. This species is met with in the Eastern interior districts of this State and is not recorded from any of the other States. The *Stipas* in general are good fodder grasses, although the "spears," or awned seeds of some of the species are so strong and sharp as to be injurious to stock feeding on them. The seed and awn of *Stipa Drummondii*, however, are smaller and more slender than the average and the same objection will not hold against it as against some of the better known species of the coastal districts. Baron von Mueller states that graziers consider these perennial grasses are very fattening and yield large quantities of feed; all kinds of stock like them. Their celerity of growth is very remarkable.

RECIPES.

Cracked Heels.—First clean with warm water and yellow soap, then apply twice daily an ointment of twenty drops pure carbolic acid, twenty grains burnt alum, one drachm calamine powder, and two ounces of lanoline ointment. Exercise twice a day and let the fluid out if closes up too quickly.

Ringworm on Young Stock.—There is no better remedy than 1lb. of finely powdered sulphate of copper (blue vitriol) dissolved in half a gallon of boiling water. When cold apply to the affected parts with a stiff brush. The solution should be applied once every six or seven days; about three dressings is generally all that is required.

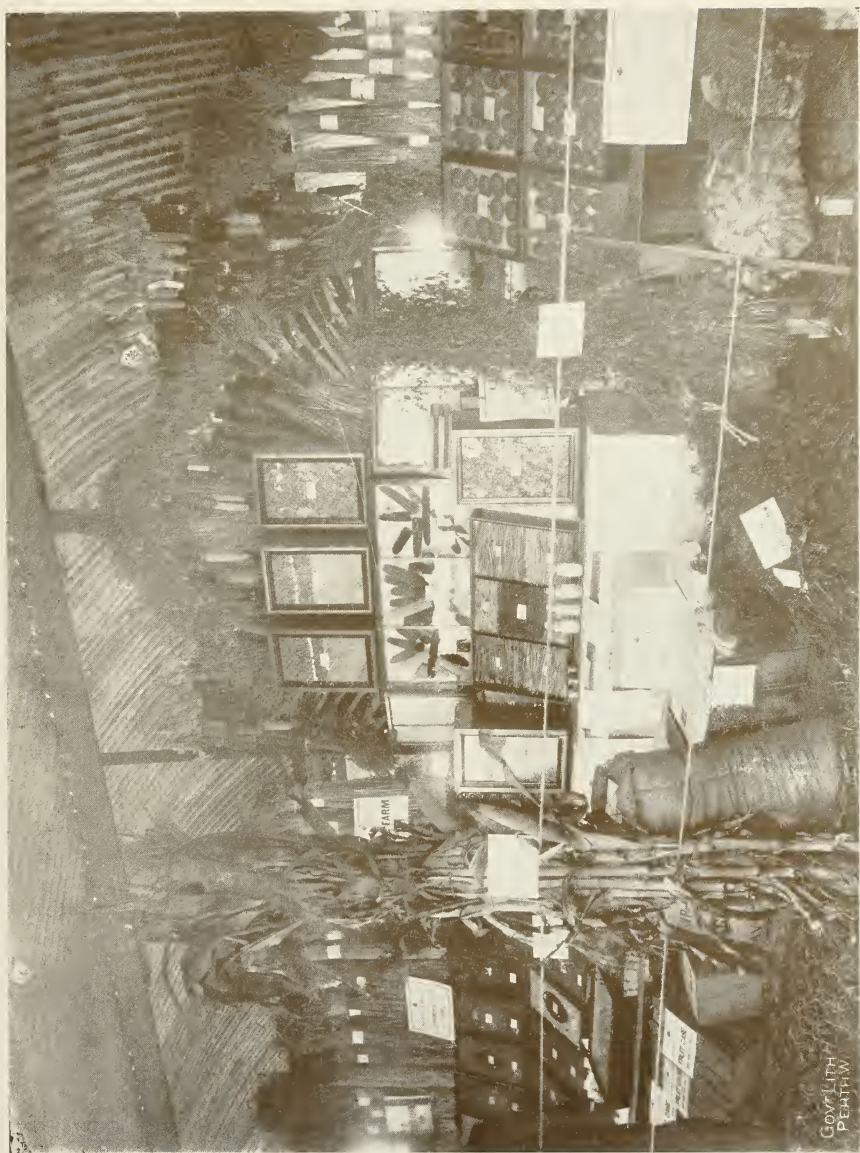
Grease.—Cleanliness is the first essential. Do not clip the heels, and do not wash them, but adopt the dry system of cleaning. After cleaning, wet thoroughly with the following lotion:—Sulphate of zinc and acetate of lead, each 1oz.; rain water, 1 quart. A solution of alum of a strength of 1oz. to a pint of water is useful in some cases. An astringent and antiseptic lotion for advanced cases where there is a good deal of soreness and discharge consists of:—2oz. each of sulphates of iron, copper, and zinc, dissolved in a quart of water, to which is added ½oz. of pure carbolic acid. As medicine, try the following ball:—Sulphate of copper, 1 drachm; powdered resin and nitrate of potash, each 1½ drachms; powdered gentian, 1 drachm; powdered white hellebore and nux vomica, each 10 grains; Castile soap to form a ball. Get a dozen made and give one every night.

LARGE PLUMP SEED.

Both practice and science have long tended to favour the use of large plump seed for the production of satisfactory yields of several descriptions of crops. As another sowing season is upon us, it is useful to have confirmatory evidence as to the importance of using large plump seed in preference to small-sized seed. During the past fourteen years tests have been made at the Ontario Experimental Station at Guelph on the subject with respect to twelve farm field crops, the tests for each crop ranging from five years for some up to eight years for the others. Both for the individual years and for the average of the years that each crop was tested the large seed gave the greatest yield for every one of these. In the case of all the crops, the tests were made in duplicate, and for each crop an equal number of seeds of each were sown at equal distances apart. In the case of root crops, three seeds of each size were dropped in the place (at the same equal distance apart) where the root was wanted to grow, and these were thinned down to one plant later. In the case of grain, roots, and rape the tests were made with seed, while with potatoes they were, of course, made with seed tubers.

The results thus obtained at Guelph are given by Professor Zavitz in a report which appears in the recently issued annual of the Ontario Farmers' Institutes. From the tables there given the following average results for each of the twelve crops on which experiments were made have been prepared:—

Crop and Years of Test.				Plump Seed Sown.		
				Large Bushels.	Medium Bushels.	Small Bushels
GRAIN YIELDS:						
Spring Wheat (8) ...	...	...	...	21·7	...	18·0
Winter Wheat (6) ...	...	...	...	46·9	...	40·4
Oats (7) ...	...	...	...	62·0	54·1	46·1
Barley (6) ...	...	...	...	53·8	...	50·4
Peas (6) ...	...	...	...	28·1	...	23·0
STRAW YIELDS:				Tons.	Tons.	Tons.
Spring Wheat (8) ...	...	...	...	1·4	...	1·3
Winter Wheat (6) ...	...	...	...	2·6	...	2·2
Oats (7) ...	...	...	...	1·9	1·8	1·8
Barley (6) ...	...	...	...	1·5	...	1·5
Peas (6) ...	...	...	...	1·3	...	1·1
ROOT YIELDS:						
Mangels (5) ...	...	...	...	31·19	27·02	18·57
Sugar Beets (5) ...	...	...	...	23·25	21·32	13·48
Swedes (5) ...	...	...	...	15·35	12·63	7·03
Turnips (5) ...	...	...	...	25·27	20·78	12·90
Carrots (5) ...	...	...	...	23·32	19·31	13·59
FODDER YIELD:						
Green Rape (5) ...	...	...	...	17·4	15·0	12·4
POTATOES (6) ...				Bushels.	Bushels.	Bushels.
				338	274	201



Department of Agriculture's Exhibits, National Show, Busseton.

GOW LITH
PEATH

These are probably the most comprehensive results we have of any set of experiments bearing on the subject of large or small seed, and the remarkable uniformity of the superiority of large seed over small for grain and straw, root and fodder crops, and potatoes alike, is strongly in favour of the larger seed. Except that the yield of straw with barley was equal from both large and small seed, the yields from small seed in no instance gave as great a yield as the large seed. There can be no doubt of the advantage of large over small seed, but in the case of corn crops and grasses some scientists favour medium-sized seed.

AUSTRALIAN WINES IN ENGLAND.

Notice of an appeal has been given in the important case recently decided at Greenwich in which a café keeper was fined for selling Australian wine as "Burgundy." As the Victorian Agent General had so far taken an interest in the matter as to send a legal representative to watch the case, he was approached by representatives of the wine company with the object of getting the Victorian Government to share the expense of the appeal. This, however, Mr. Taverner refused to do, stating that no question as to the quality of the wine was involved, and that the case centred largely upon the admitted fact that wrong labels had accidentally been put on the bottles by the wholesale dealer. At the same time, Mr. Taverner recognises that the British Wine and Spirit Association, which initiated these proceedings, is relentless in its hostility to the use of established names to designate wines from Australia. The Association is deeply interested in the preservation of the Continental wine trade as against the industries of newer countries. At the Franco-British Exhibition the French jury declined to adjudicate on Australian wines as soon as they saw French names in use, but there is no doubt that the opposition really arose from agents on this side, because they feel that Australian wine of the Burgundy type is strengthening in its hold and selling at the same price as the French wine. The French Government has not, Mr. Taverner stated, raised any objection, as asserted on behalf of the Wine and Spirit Association. If such an objection had been presented to the Foreign Office, the Agents General for the different States would have been apprised of it. As a matter of fact, an attempt to pass legislation against the use of the word "champagne" in designating wines other than those from a specified district was incontinently dropped by the French Legislature. For years the vine-growers in the Burgundy provinces have been selling cuttings of their vines, the avowed object of the purchasers being the raising of Burgundy wines in other parts of the world.

HINTS ON IRRIGATION.

(*Pacific Rural Press.*)

"Don't irrigate too much. Over-saturation checks the growth of plants and trees by lowering the soil temperature and at the same time completely shuts out the air. This practice takes money out of the grower's pocket. Roots, like human beings or anything that breathes, must have air for life and growth. The water-holding capacity of soils runs from 40 to 60 per cent. of the total solid volume, and 45 per cent. of the whole is about as much water as should be put on the soil at any time. The best results from the application of moisture on ordinary crops have been obtained by using 25 per cent. of the water-holding capacity of the soil at planting, decreasing gradually to 15 per cent., remaining at that point until the leaves are formed, then increasing quickly to 40 per cent. and allowing the water to fall rapidly to from 12½ to 15 per cent., and remain there during the fruiting and maturing period."

H. L. McIntyre, C.E., of Spokane, an authority on irrigation subjects, emphasised the foregoing points in his paper on "Practical Irrigation," read before the Washington Horticultural Association at its annual meeting in Spokane, December 8 to 12. He indicated that practical irrigation is scientific in form and covers a broad field in its many phases, and urged irrigationists to study dry-farming methods, as well as read irrigation and farm journals, declaring that the first requisite to be a successful irrigator is to be a first-class dry farmer, adding: "If you can't dry farm, you can't irrigate." Mr. McIntyre said it is the practical side of irrigation that appeals to the farmer and orchardist and fruit-grower. They want to know how much water to use, when to apply it, and how. To know these things the grower must first ascertain certain facts regarding the land before he is ready to irrigate practically and intelligently. The speaker grouped them as follows:—

First. The depth of soil.

Second. The relative position of top subsoil.

Third. Slope of surface for drainage purposes.

Fourth. Slope and characteristic of subsoil for under-drainage.

Fifth. The percentage of moisture the soil holds stored in its present condition.

Sixth. The water-holding capacity or amount of water the soil contains when in a state of complete saturation.

Seventh. The degree of fineness or grain of the soil.

"With these questions solved," Mr. McIntyre said, "the grower is ready to irrigate with some degree of certainty as to what the result will be; without the facts the grower occupies the position of the head of a mercantile house without his books and statements and invoices. To ascertain these facts is not a complex process, as you can see:—

"First. The way to ascertain the depth of the soil would be to bore auger holes at short intervals over your tract of land. Bore one foot in depth at a

time, pull the auger, save the soil and put in a glass jar and seal it up to prevent the moisture from evaporating. Bore the second and third foot, and on down to the subsoil in like manner until you have a sample of each foot of soil.

"Second. The relative position of top and bottom soil you have ascertained by boring holes in the first instance.

"Third. If the surface slope is too level to determine by the eye, employ a surveyor to run levels over the ground and furnish you a map showing the elevations in one-foot contours, or in squares of 100 feet. This will always be extremely useful to anyone in the distribution of water for irrigation.

"Fourth. Knowing the depth of your subsoil at all points and the surface slope, the relative slope of the two is apparent.

"Fifth. To ascertain the percentage of moisture the soil holds stored in its present condition, take the samples of soil you have in the sealed glass jars from your borings. Weight each sample separately, note the part of the field from which it was taken, then dry each sample perfectly and weigh again. The difference is the amount of moisture in the soil, from which you ascertain the percentage of moisture in each foot of soil from the subsoil to the top.

"Sixth. The water-holding capacity of the soil may be determined by taking a box one foot square and one foot high with a fine screen for the bottom. The capacity of the box will be one cubic foot. Fill the box with soil, pour water on it with a sprinkler until the water drips off at the bottom through the screen. As soon as the dripping stops, weigh the box and contents. Then dry the earth and weigh again. The difference between the two weights gives you the amount of water the soil will hold in its water-holding capacity.

"The soil is a sponge, and you can only fill the voids with water. Having learned all the conditions, you know how much water it will require to bring about a certain percentage of moisture in the land you wish to irrigate. You know how it drains, whether it leaches down or runs off in the subsoil. You can ascertain at any time whether your percentage of moisture is too low or too high; also how deep you can store water in the soil, and know how much it takes to wet it one foot down.

"Seventh. When you begin to experiment you will find that the saturating capacity of soils, even in the same field, vary greatly. When the soil is so full of water that the air is shut off, no new roots are formed, and no new water is taken up, and as a result the growth suffers. The soil requires air and sun as well as moisture.

"Shallow soils with gravel or open subsoil leach the moisture rapidly and there is less danger of over-saturation, but the continual pouring of water through such soil will often carry away the fertilising elements which are in solution and soon deplete the soil. Find out how much water your soil will hold in suspension and irrigate accordingly. The soil is a chemical laboratory and you are the chemist. The soil must have moisture, air, and the heat of the sun to keep the chemical action at work making plant food. When you have too much water in the soil there is no air, hence no chemical action. With too much air there is no moisture and no chemical action. With proper

moisture and cultivation the chemical action is complete, the capillary attraction bringing up the moisture from the lower levels to the top mulch. Here the sun and the air manufacture the fertilising elements and the next rain or irrigation washes them down to be taken up by the roots. The process repeats itself without end, so long as we water and cultivate properly.

"Cultivation is more important than irrigation, and in the arid regions one is of little use without the other. Don't overlook the fact that a weed is a pump, and that it draws water out of the soil at a rapid rate. Of course it is difficult to control exactly the amount of moisture, but a great deal can be done in this direction and will amply repay anyone who will take the trouble to apply his water to crops scientifically.

"The most economical method of irrigating land and at the same time one that gives the almost complete control of the water is the pipe system, delivering water under pressure to each tract of land. Pipe lines are used in California for surface and sub-irrigation systems. In some cases as high as 1,000 acres of land is watered with a flow of one cubic foot per second. In Washington, under the present open-ditch system of irrigation, 200 acres with this amount of water would be above the average."

THE DISEASES OF ANIMALS USED FOR FOOD AND THEIR DETECTION.

(*Special to "Meat Trades' Journal."*)

The lectures on the meat industry which are being given at the College of Agriculture, Edinburgh, by Professor London M. Douglas continue to attract much attention, and large audiences have been the rule throughout. This pleasing state of affairs shows how much these lectures are appreciated, and emphasises the fact that similar opportunities would be taken advantage of if provided in other parts of the United Kingdom. The notices which were published in the *Meat Trades' Journal* appear to have been very widely read, as they have brought inquiries and correspondence to Professor Douglas from all parts. Many have inquired whether these lectures are to be published in full, and they have been informed that apart from the full reports given in our columns there is no intention of publishing them in detail at present. Professor Douglas is engaged on a textbook which will embrace most of what his lectures have contained, and it will be supplemented with additional matter of a technical nature which will be supplied by a distinguished colleague.

On January 7th Professor Douglas lectured on the subject of "The Diseases of Animals used for Food and their Detection," and at the outset recalled the various aspects of the meat trade which so far had been discussed in his lectures. He showed how that coincident with modern develop-

ments there had arisen a demand for meat which could be guaranteed to be wholesome and sound, hence the great importance of the position of meat inspectors who, in the absence of technical knowledge on the part of the meat purveyors, must be the supreme authorities where diseases of meat are concerned. The present year had seen the institution of a process of examination of imported meat which would have far-reaching effects, and would at least provide uniformity of inspection as between home and foreign supplies. The lecturer proceeded to say that the only consideration which the meat purveyor had was whether meat was sound or otherwise, and in the main his business was with cattle, sheep, and pigs, so that his province was a restricted one. As the meat supply was so important, it was necessary that technical knowledge of soundness or otherwise should be provided by someone not practising the business—namely, the meat inspector, and against his opinion the meat purveyors had hardly any appeal owing to the fact that it was well known that they were not skilled in the detection of disease.

The theory of meat inspection is based upon the view that the consumer has a right to be protected against diseased meat. The common diseases met with in meat, and which were transmissible to human beings, were derived from the presence of animal parasites such as trichinæ and tapeworms; and diseases arising from poisonous infection such as in the case of tuberculosis, foot-and-mouth disease, anthrax, rabies, septicæmia, and pyæmia. There was also the possibility of poisoning from ptomaines. The characteristics of all of these conditions were comparatively well known and could be recognised by the experienced.

The lecturer then described the characteristics of these various diseases in detail, and with regard to tuberculosis stated that the last returns issued by the Registrar showed that in Scotland tuberculous disease accounted for 9,999 deaths in 1906, which was 380 more than the previous year, and 209 higher than the average of that and the previous four years. In face of such facts we were bound to assume that there was a connection between bovine tuberculosis and the human, and the fact that consumption or tuberculosis was on the increase had surely some bearing on the fact that forty per cent. of our cows were affected with the disease.

The remedy was to take heroic measures to stamp out the disease, and let the nation make up its mind to apply the tuberculin test throughout the country and destroy every animal that reacted. Surely human lives were of more value than our flocks and herds!

The lecturer indicated many conditions of meat which might be looked upon as dangerous, and went on to say that one of the most insidious of evils connected with meat was ptomaine poisoning. Ptomaines were the products of certain bacteria, and were chemical substances not destroyed by heat, so that if the bacteria in meat could be destroyed by cooking the chemical poison remained. This was a department of the meat industry which baffled everyone, inasmuch as it was not possible to detect these ptomaines except by a long and laborious process of investigation, far removed from the province of the meat purveyor; hence the question remained unsatisfactory, and many deaths took place from this cause annually. From a casual collection of newspaper references collected between June, 1907, and November, 1908, it appeared that there were 822 cases of ptomaine poisoning in the United Kingdom alone. Many of these could have been prevented by the judicious use

of a harmless antiseptic in meat and pork products, but the law, as interpreted by certain medical officers of health and magistrates, took the view that no such safeguard was necessary. It might be liable to abuse, and therefore the people must die.

The lecturer then described in detail the characteristics of wholesome meat as it should appear, and went on to say, "These are the general principles upon which meat inspection may be carried out, and by which the diseases of animals used for food may be detected. Much has been said by irresponsible writers from time to time to the effect that meat purveyors are careless in this matter of the supply of our fresh food, and that they are more concerned to make a profit out of the products they handle than have regard to their quality or freedom from disease. I do not agree with that opinion, and, from a long and intimate knowledge of meat purveyors in many parts of Europe, I have come to the conclusion that they are, as a body, as desirous as any medical or other officer of health of guarding the public health, and would not willingly, if they knew, permit a single ounce of unsound food to be sold in their premises, and the few dishonourable men who do otherwise may be neglected and left to be dealt with by the law.

"It is essential, however, that in the future meat purveyors should have an opportunity of obtaining technical education which will enable them to the more readily detect what is sound and what is unsound, and thus enable them also to prevent the unsound, as would be their wish, from being distributed to consumers."

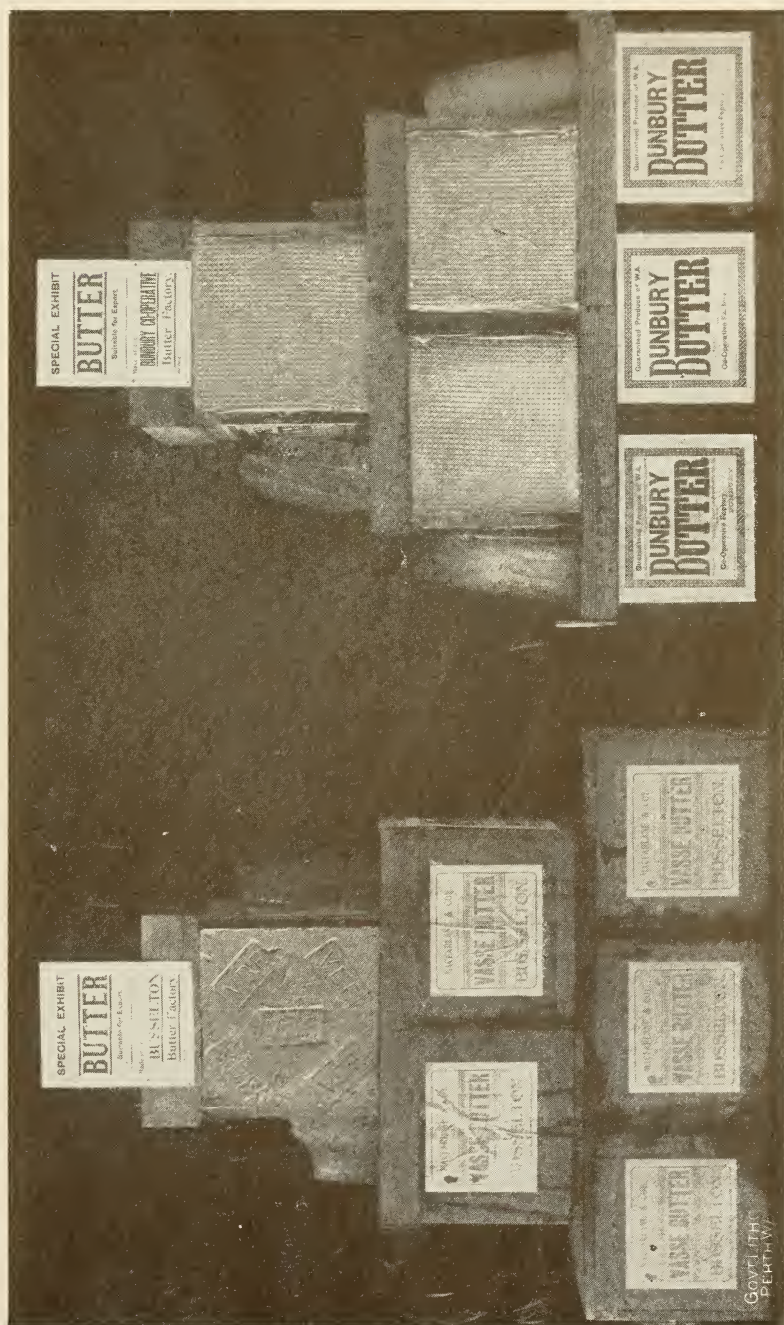
TUBERCULOSIS.

INFECTIVITY OF MILK AND EXCRETA.

(*Mark Lane Express Agricultural Journal.*)

The third interim report of the Royal Commission appointed to inquire into the relations of human and bovine tuberculosis, issued recently, contains a most interesting and instructive account of certain experiments carried out regarding the infectivity of the milk and secretions of naturally-infected tuberculous cows; that is, cows that had contracted the disease in the ordinary way. The Commissioners state:—

Tuberculosis involving the udder is comparatively common in cows, and in such cases their milk always contains tubercle bacilli, and is therefore dangerous for human beings consuming it. It was, however, undecided what is the danger, if any, attaching to the milk of tuberculous cows in which the udder presents no evidence of disease. We therefore took the opportunity of making a number of observations and experiments bearing on this point. The experiments were made with the milk of cows which had contracted the disease in the natural way. In natural tuberculosis in the cow, cases which show such obvious symptoms of the disease as emaciation and cough should be considered separately from the cases in which there are no such signs and



Bunbury Factory Butter at the National Show, Busselton.

in which the disease is to be recognised during life only by means of the injection of tuberculin.

None of the cows investigated showed any sign of disease of the udder during life, and in all, after slaughtering, the udder was carefully examined for tuberculous lesions and tubercle bacilli. No tuberculosis was found except in one case in which one quarter of the udder showed four small nodules. These could not possibly have been detected during life. We found that the milk of cows obviously suffering from tuberculosis contained tubercle bacilli whether the milk was obtained in the ordinary way or was withdrawn from the teat by means of a sterilised catheter. The presence of tubercle bacilli in the milk of cows clinically recognisable as tuberculous confirms the opinion we expressed in our second interim report that the milk of such cows must be considered dangerous for human beings.

The experiments which we have carried out with regard to the infectivity of the fæces of tuberculous cows were dictated by knowledge of the fact that dirt of various kinds from cows and the cowshed is almost constantly present in milk as it reaches the consumer. Cows suffering from extensive tuberculosis of the lungs must discharge considerable numbers of bacilli from the air passages in the act of coughing, and some of the bacilli thus expelled may find their way into the milk. But our experiments indicate that the excrement of cows obviously suffering from tuberculosis of the lungs or alimentary canal must be regarded as much more dangerous than the matter discharged from the mouth or nostrils. We have found that even in the case of cows with slight tuberculous lesions tubercle bacilli in small numbers are discharged in the fæces, while as regards cows clinically tuberculous, our experiments show that the fæces contain large numbers of living and virulent tubercle bacilli.

The presence of tuberculous cows in company with healthy cows in the cowshed is therefore distinctly dangerous, as some of the tubercle bacilli which escape from their bodies in the excrement are almost certain to find their way into the milk.

AGRICULTURE IN HUNGARY.

On January 11th and 12th last Prof. Loudon M. Douglas delivered two lectures on the subject of Hungarian Agriculture, at the University of Edinburgh, and as the result of a recent visit which he had paid to Hungary. He wished to express, first of all, his indebtedness to His Excellency Dr. Daranyi, the Minister of Agriculture, for much assistance with the preparation of the lectures and also for the illustrations, which consisted of a large number of lantern slides prepared from photographs, and also a collection of agricultural products of an interesting kind.

The lecturer described the features of Hungary and its exact position in connection with the other countries in Europe, and also pointed out that it was subject to great fluctuations in temperature, these being very high in summer and very low in winter; both extremes in their own way, suspending, to a large extent, agricultural operations.

Buda-Pest is the capital of the country and is a magnificent modern city. Amongst its splendid institutions and colleges it possesses the Royal Hungarian Agricultural Museum, which is said to be the largest institute of its kind in the world. The large estates in Hungary form a feature in the country, and these were owned partly by private individuals and also by the State. Of recent years, however, they have been to some extent broken up into small holdings, which now occupied some 15 million acres of territory. The principal industry carried on under the Board of Agriculture was that of animal breeding, and involved the specialisation of the breeding of horses, horned cattle, sheep, pigs, and poultry; but the greatest of all these was the industry of horse-breeding, which is carried on at the State farms at Mozohegyes, Kiabér, and Bábolna.

The lecturer was able to give a large number of illustrations of the various English thoroughbreds, Arabs, and other horses which are used to improve the native stock, and went on to point out that this horse-breeding industry was very important to Hungary, inasmuch as the annual export amounted to 1½ million pounds sterling.

The principal crops grown in Hungary were wheat, rye, and maize, but there were many others which were also cultivated, such as tobacco, which was a State monopoly, and which was being largely fostered and developed. Dairying was affected, not only by the breeding of cattle, but the breeding of milk-giving sheep, the milk of which was used in the manufacture of butter and cheese. Buffalos were kept, as were the Hungarian native cattle, very largely for the purposes of draft oxen, and, while they were slow in movement, their use was considered economical on the farm.

Wine-growing was an industry by itself, and it had attained to great dimensions in Hungary. Hungarian wine was not very well known in Western Europe, but it was very largely consumed in the country itself. The whole industry, however, was so great, that it would not be possible to deal with it, except as a special subject by itself.

The control of the rivers and the reclamation of the land were also interesting subjects, and it had paid the State to build retaining banks along the principal rivers, so as to save the farms adjoining them from floods.

On the whole, it might be said that the progress which had taken place in Hungary during the last 25 years had placed it in the highest rank amongst civilised nations.

GOVERNMENT LABOUR BUREAU.

FEBRUARY REPORT.

Mr. James Longmore, Superintendent of the Government Labour Bureau, reports as follows on the work of the Department for February:—

Perth.

Registrations.—The total number of men who called during the month in search of work was 896. Of this number 444 were new registrations and 452 renewals, *i.e.*, men who called and had their names registered since July 1,

1908. The trades or occupations of the applicants were as follows:—Labourers 306, handy lads 92, farm hands 91, handy men 68, carpenters 43, cooks 35, miners 20, bushmen 16, gardeners 16, painters 13, drivers 12, grooms 12, hotel hands 11, clerks 10, engine-drivers 9, blacksmiths 8, plasterers 8, bakers 7, engineers 6, survey hands 6, yardmen 6, butchers 5, bricklayers 5, fitters 5, sawmill hands 5, strikers 4, firemen, ironmoulders, market gardeners, orderlies, stockmen, seamen, station hands, 3 of each, boilermakers, caretakers, canvassers, commercial travellers, electricians, groom-gardeners, joiners, navvies, orchardists, shoeing smiths, 2 of each, and 36 miscellaneous.

Engagements.—The engagements for the month numbered 315. The classification of work found was as follows:—Labourers 46, bushmen 94, farm hands 36, handy lads 18, handy men 17, sawmill hands 16, carpenters 12, miners 11, cooks 8, lads for farms 8, woodcutters 5, dairymen 4, plasterers 4, wellsinkers 4, bakers, blacksmiths, carpenters (rough), gardeners, survey hands, 3 of each, drivers, market gardeners, orderlies, yardmen, 2 of each, and miscellaneous 9.

Fremantle.

Registrations.—The applicants for work numbered 19. There were 10 new registrations and 9 renewals. The classification was:—Labourers 9, handy men 3, carpenters 2, handy lads 2, boilermakers, bullock-drivers and miners 1 of each.

Engagements.—The engagements numbered 6, classified as:—Bushmen 3, sawmill hands 2, and labourers 1.

Kalgoorlie.

Registrations.—The applicants for work numbered 30. There were 16 new registrations and 14 renewals. The classification was:—Labourers 13, handy men 5, miners 3, engine-drivers 2, handy lads 2, bakers, carpenters, fitters, grooms, and travellers, 1 of each.

Engagements.—The engagements were 5, classified as:—Labourers 3, 1 each of handy men and miners.

The female servants who called numbered 9. There were 6 new registrations and 3 renewals. The classification was:—Generals 4, cooks 3, housemaids and light generals 1 of each. There was one engagement, viz., general.

Northam.

Registrations.—The applicants for work numbered 5. The classification was:—Labourers 2, farm hands, handy men and waitresses, 1 of each.

Engagements.—*Nil.*

Women's Branch, Perth.

Registrations.—There were 63 new registrations and 59 renewals, total 122. The classification was:—Laundress-charwomen 28, light generals 17, housemaids 16, cooks 15, generals 12, waitresses 6, useful girls 6, ladyhelps 6, housekeepers 5, cook-laundresses 3, governesses 3, nursemaids 2, needlewomen 2, barmaid 1.

Engagements.—There were 60 engagements, classified as:—Laundress-charwomen 37, generals 11, light generals 3, housemaids 3, cooks 2, nurses, housekeepers, ladyhelps, and useful girls 1 of each.

General Remarks.

The number of individual men who called at the Central Office, Perth, during the month in search of work was 896. This total is 139 short of that for February last year. The engagements were 315 as against 346 for the corresponding month of 1908. During the month there were 201 men assisted by railway passes from the Perth office. The fares refunded totalled £94 4s. 9d., and the sum of £10 7s. 6d. was received from employers to send workers, the whole amounting to £104 12s. 3d.

GARDEN NOTES FOR APRIL.

Hot summer weather will now be succeeded by regular rains, and the ground should be thoroughly prepared for early sowing, which always returns the best crops. Deep sub-soiling and trenching should receive every attention. Cabbages, cauliflowers, lettuce, onions, etc., should be sown for transplanting, either in beds or boxes. See that weeds do not get the upper hand after rain sets in, as they will grow with great rapidity if not kept under.

During the month the following can be sown for main crops: artichoke, asparagus, American cress, broccoli, Brussels sprouts, cabbage, carrot, cauliflower, celery, cress, endive, herbs, kohlrabi, leek, lettuce, onion, parsley, parsnip, red beet, salsify, Scotch kale, and spinach. Also, broad beans, radish, peas, potatoes, rhubarb, shallots, swedes. Young cabbage, cauliflower, celery, and other plants can be planted out.

The ground must be well cultivated and thoroughly cleaned with the requisite amount of manure or fertiliser as the nature of the soil may require.

The Orchard and Flower Garden.—The same careful attention is necessary in the orchard to keep the ground well cultivated, opened up around the trees to admit the refreshing air and moisture. Drainage requires to be well looked after. Young fruit trees can be planted out, including orange, lemon, mandarin, etc., and also evergreen shrubs and trees in the garden. The latter and seeds for flower beds form a very comprehensive list, and it is better to consult the nurseryman to make a selection of suitable varieties. Bulbs can be planted, such as anemones, crocus, daffodils, gladioli, hyacinths, iris, jonquils, snowflakes, tulips, and many others. Perennials and annuals can be planted out.

The Farm.—Ploughing can be put into as full swing as possible, fallow land can be harrowed or scarified preparatory to sowing, before the rains have fully set in and the ground is very soft. When sufficient rain has fallen, cereal sowing should be entered upon without loss of time. Wheat, oats, and barley seed should be first pickled as a safeguard against smut. The solution is composed of 1lb. of bluestone to 5 gals. of water. Growers should give careful attention to the selection of best seed for sowing.

Sow beans, Cape barley, drumhead cabbage, pasture grasses, lucerne, mustard, peas, rape, sainfoin, thousand-headed cabbage, tares and barley or rye, trefoil, trifolium, etc. Crops should be grown for filling the silo.

MARKET REPORTS.

GENERAL SUMMARY.

FARM PRODUCE.

Supplies of chaff have been limited generally and prices have not shown any advance. Prices ranged as follows:—

Chaff.—Prime fresh qualities, *ex* truck, £4 10s. and £4 7s. 6d.; good mediums, £4 and over; inferior, £3 12s. 6d.

Oaten Chaff.—Prime, £4.

Straw Chaff.—£3.

Wheat.—f.a.q., milling, 4s. and 4s. 1d.

LIVE STOCK.

The market has been fairly active and good yardings have prevailed. In country districts satisfactory prices have been realised for sheep and pigs. Cattle and horses are not reported.

Sheep.—Prime wethers, to 18s. 3d.; fat ewes and wethers, mixed, 16s. 9d.; light ewes, 12s. 8d.; lambs, 8s. 6d., 10s. 6d. to 13s. 6d.

Pigs.—Porkers, 19s. to 30s. and 33s. 6d.; lighter, 19s. 6d. to 21s. 6d.; sows, 37s. 6d.; slips, 13s. 6d.

PRODUCE MARKETS.

There have been good supplies in the Metropolitan fruit and vegetable markets, the ruling rates being as follows:—

Fruit.—Apples, Jonathans, 3s. 3d. to 6s.; Adams, 2s. 9d. to 3s. 9d.; mixed varieties, 1s. 9d. to 3s. 9d. Pears: Williams, 6s. 9d. to 11s.; Flemish Beauty, 5s. 6d. to 8s. 9d.; inferior, from 3s.; mixed and cookers, 1s. 9d. to 3s. 6d. Peaches, 4s. 3d. to 7s. 3d.; inferior, from 2s.; $\frac{1}{4}$ cases, 2s. to 2s. 9d. Plums, 7s. 9d. to 10s.; others, 4s. 6d. to 6s. 6d.; passious, 6s. 3d. Quinces, 1s. 6d. to 2s. 6d. Lemons, 7s. 6d. to 9s. 9d.; large, from 5s. 9d. Grapes: Muscats, kerosene case, 9s. to 11s. 3d.; closed, 3s. 9d. to 4s. 3d.; Centennials, open, 9s. 3d.; Red Malaga, 7s. to 7s. 9d.; Goose Coleman, 8s. to 8s. 9d.; Ladies' Fingers, 9s. 6d.; Santa Paula, 8s. 3d. to 9s.; closed, 5s. 6d.; Blue Imperial, open, 5s. 6d.; Black Washington, 5s. 6d. to 6s.; Raisins des Dames, 6s.; Flame Tokay, 7s. 9d. to 8s.; Wortley Hall, 6s. 3d. to 9s.; others, from 4s.; Red Muscats, 6s. 3d.; Doradillos, 3s. to 4s. 9d.; inferior, from 1s. 9d.

Vegetables.—Tomatoes, 2s. to 4s. 3d. Cabbage, 8s. 3d. to 14s. 6d.; inferior, from 2s. 9d.; pots, 8s. to 9s.; others, from 6s. 6d. Pumpkins, iron-bark, 4s. 3d. to 5s. 9d.; others, from 2s. 3d.; bugle, 4s. 6d. Marrows, 1s. 6d. to 2s. 4d. Parsnips, 1s. 1d. to 2s. 2d. Carrots, 8d. to 1s. Turnips, 1s. 2d. to 1s. 5d. Beet, 7d. to 1s. 7d. Rhubarb, 1d. to 2 $\frac{1}{4}$ d. Celery, 1s. 4d. to 2s. 8d.; others, 4d. to 10d. Lettuce, 7d. to 1s. 11d. Onions, brown, 9s. 3d. French beans, 1 $\frac{1}{2}$ d. to 2 $\frac{1}{4}$ d. Peas, 3d. to 3 $\frac{1}{2}$ d. Cucumbers, 10d. to 2s. per dozen. Water melons, 4s. to 10s. 6d.; small, from 1s. Rock melons, 1s. 8d. to 4s. 9d.; small, from 6d.

Poultry.—Cockerels, 2s. to 6s. 3d. Ducks, 3s. 3d. to 7s. Hens, 2s. 9d. to 5s. Turkeys, hens, 8s. to 10s.; gobblers, 15s. to 19s. Suburban eggs, 1s. 6d. to 1s. 9d.

ADELAIDE PRODUCE MARKET.

Adelaide, March 12.

No local alteration took place in wheat to-day, farmers selling sparingly at 4s. 1d.; no business being reported in parcels. Flour, nominally £9 15s. Bran, 1s. Pollard, 1s. 3d. Butter, 1s. 2½d. to 1s. 3½d. Eggs, 1s.

MELBOURNE PRODUCE MARKET.

Melbourne, March 12.

Wheat, 4s. 4d. to 4s. 4½d. Flour, £9 15s. Bran, 11½d. Pollard, 1s. 1d. Oats, 1s. 7d. to 1s. 11d. Maize, 4s. 1d. to 4s. 3d. Peas, 4s. 3d. Chaff, £2 12s. 6d. to £3 5s. Potatoes, £3 to £4. Onions, £6 5s. to £6 10s.

LONDON MARKET.

Messrs. W. Weddel & Co. report under date, London, 12th February:—

Wheat.—An active trade has been experienced during the past fortnight—a large number of cargoes in all positions having changed hands at an advance of 1s. to 1s. 6d. per quarter from previous rates. Stocks on the Continent as well as in the United Kingdom are reduced to a low level, in consequence of buyers delaying purchasing as long as possible, and who are now in actual need. The fact of very heavy shipments from Australia and the Argentine has not had the effect of weakening the market as might have been expected, and which gives some indication of the strong position wheat is in. Reports from the Argentine as to the poor threshing returns is an unlooked for feature, and should there be any serious falling-off in this respect it is difficult to see where wheat supplies sufficient to meet normal weekly requirements are to come from, and it is not improbable there may be a serious pinch before the next six months are over, as England, Germany, and Italy will all require to import more wheat than last year for actual needs, and also to replenish stocks. At the close the market is very firm at the higher prices. The weather throughout the United Kingdom and the Continent has again become colder, which is beneficial for the young wheat plant. The growing crop is looking exceptionally well.

Lambs.—Arrivals during the fortnight consist of 126,622 carcasses from Australia, 81,984 carcasses from New Zealand, and 69,534 carcasses from South America. The demand for Australian lambs is still dragging, and prices are weak in consequence of heavy offerings. The top price for Melbourne, Adelaide, or Sydney lambs of best quality is now not more than 4¼d. per lb., while for some first quality brands 4d. is being accepted. Useful quality can be bought at 3¾d. to 37½d. per lb. Inferior qualities are plentiful, and cannot be quoted at more than 3½d. per lb. Offerings of New Zealand lambs are now more freely made, and these early arrivals are meeting a bad market in consequence of the cheapness of home-grown mutton, and the low prices accepted for Australian and Argentine parcels. North Island lambs realise about 5¼d. to 5¾d. per lb.; and the few Canterbury lambs now here cannot be

quoted at more than 5½d. to 57½d. per lb. Argentine lambs are freely offered at from 3½d. to 4d. per lb., according to quality.

LONDON WOOL SALES.

Messrs. Dalgety and Company, Limited, report having received cable advices from London furnishing the average price for fleece and lambs' wool for the following Western Australian clips sold in London during the March series:—Coondeena, 53 bales, 11½d. R. & S., 65 bales, 10½d. Westfield, 39 bales, 10½d. H. & H., 38 bales, 9½d. D. & D., 164 bales, 9¼d. Nan-garra, 28 bales, 8¼d. Mardathuna, 66 bales, 8d.

BULLETINS ISSUED BY THE DEPARTMENT OF AGRICULTURE.

Settler's Guide, 2nd, 3rd, 4th and 5th editions.

Handbook of Horticulture and Viticulture (A. Despeissis). 2s. 6d. and 1s.

New Dairying ("Agricola").

Diseases of Honey Bees (John Sutton).

What can be done by the Beginner on the Soil (Hon. James Mitchell, Minister for Agriculture).

Stack Silos (A. Despeissis).

Report of Proceedings of Conference of Producers, 1907.

Factory Dairying (J. A. Kinsella).

Vegetable Growing (G. Chitty Baker).

Examination of the W.A. Poison Plants (E. A. Mann).

Care and Treatment of Milk and Cream (J. A. Kinsella).

Hints to Stock-breeders (Weir).

Meat Inspection and Diseases of Animals (J. B. Cleland, M.D.).

Poultry, Care and Management of (F. H. Robertson).

Back volumes *Journal of Agriculture*.

Tobacco Cultivation (H. Allerton Cowper).

Cotton-growing (H. Allerton Cowper).

Dingo Trapping.

The New Sun-Dial (W. E. Cooke).

The Silo on the Farm (J. A. Kinsella).

Conference of Producers, 1908—Report of Proceedings.

Diseases of animals and Meat Inspection (1908) (J. Burton Cleland, M.D., Ch. M., Sydney).

Trypanosomiasis and other diseases of camels (J. Burton Cleland, M.D., Ch. M., Sydney).

Free copies of such publications as have no prices attached can be obtained on application.

Rainfall for the month of February, 1909, recorded at telegraphic stations in Western Australia, and averages.

STATIONS.	*Total for February, 1909, in points.	No. of wet days.	Average for February, 1909.	No. of Years Records.	STATIONS.	*Total for February, 1909, in points.	No. of wet days.	Average for February, 1909.	No. of Years Records.
TROPICS :					NORTH COOLGARDIE				
Wyndham ...	758	14	583	22	FIELDS :				
Turkey Creek ...	1245	15	706	11	Sandstone ...	4	1	...	...
Hall's Creek ...	713	13	474	18	Wiluna ...	53	3	149	10
Fitzroy Crossing ...	388	11	784	15	Mt. Sir Samuel ...	69	2	169	8
Derby ...	487	12	674	23	Lawlers ...	2	1	120	12
Broome ...	492	9	669	19	Mt. Leonora ...	10	3	105	11
La Grange Bay ...	432	10	554	18	Mt. Malcolm ...	Nil	...	119	11
Wallal ...	120	1	340	12	Mt. Morgans ...	Nil	...	137	18
Condon ...	7	3	308	18	Laverton ...	Nil	...	98	9
Bamboo Creek ...	152	3	251	11	Murrin Murrin ...	Nil	...	101	9
Marble Bar ...	187	5	328	13	Yundamindera ...	Nil	...	115	8
Warrawoona ...	24	2	338	9	Kookynie ...	8	1	66	7
Narragine ...	80	7	193	11	Niagara ...	Nil	...	101	12
Port Hedland ...	26	1	407	11	Menzies ...	Nil	...	142	12
Whim Creek ...	30	2	356	11	Mulline ...	63	2	177	7
Roebourne ...	5	2	250	22					
Cossack ...	Nil	...	238	27	COOLGARDIE GOLD-				
Fortescue ...	Nil	...	154	21	FIELDS :				
Onslow ...	3	1	72	23	Davyhurst ...	15	2	101	7
Winning Pool ...	14	2	152	11	Goongarrie ...	7	1	150	13
WEST COASTAL :					Broad Arrow ...	10	2	126	11
Carnarvon ...	9	1	55	26	Kurnalpi ...	50	1	120	10
Sharks Bay ...	40	1	29	15	Kanowna ...	58	2	81	33
Wooramel ...	Nil	...	38	10	Bulong ...	27	1	102	12
Hamelin Pool ...	Nil	...	58	25	Kalgoorlie ...	45	1	66	13
Northampton ...	20	1	42	28	Coolgardie ...	64	2	73	16
Mullewa ...	57	3	33	13	Burbanks ...	26	2	69	7
Geraldton ...	6	3	17	31	Widgemooltha ...	41	1	83	11
Greenough ...	3	2	21	27	Norseman ...	60	1	93	12
Dongarra ...	2	1	33	26	Boorabbin ...	155	2	98	14
Minginew ...	22	2	22	13	Southern Cross	53	2	49	19
Carnamah ...	109	4	49	21					
Dandarragan ...	Nil	...	20	11	S.W. COASTAL :				
Moora ...	25	1	23	11	Gingin ...	Nil	...	25	20
Walebing ...	21	1	34	25	Kalamunda ...	1	1	...	...
New Norcia ...	17	2	24	26	Guildford ...	4	1	37	29
MURCHISON FIELDS :					Perth Gardens ...	6	1	35	33
Peak Hill ...	64	6	133	11	" Observatory	7	1	15	12
Abbotts ...	29	2	126	10	Fremantle ...	1	1	35	30
Gabanintha ...	38	3	72	9	Rottneet ...	3	1	38	27
Nannine ...	10	2	85	14	Rockingham ...	10	1	14	11
Cue ...	5	3	75	14	Jarrahdale ...	Nil	1	37	26
Day Dawn ...	8	2	56	13	Mandurah ...	5	1	37	17
Lake Austin ...	66	4	43	11	Pinjarrah ...	10	1	38	28
Lennonville ...	128	3	122	8	Collie ...	6	1	20	8
Mt. Magnet ...	87	3	74	14	Brunswick Junct.	Nil	...	...	...
Yalgoo ...	121	2	82	12	Bunbury ...	Nil	...	42	32
Murgoo ...	205	2	56	20					

*100 points=1in.

RAINFALL—*continued.*

STATIONS.	*Total for February, 1909, in points.	No. of wet days	Average for February, 1909.	No. of Years Records.	STATIONS.	*Total for February, 1909, in points.	No. of wet days.	Average for February, 1909.	No. of Years Records.
S.W. COASTAL— <i>con- tinued.</i>					S.W. INLAND— <i>con- tinued.</i>				
Donnybrook ...	3	3	29	8	Arthur ...	21	1	44	18
Busselton ...	<i>Nil</i>	...	26	28	Wagin ...	5	1	67	18
Cape Naturaliste	13	4	...	...	Katanning ...	62	2	51	17
Karridale ...	25	6	52	15	Broomehill ...	38	4	68	18
Cape Leeuwin ...	20	8	55	12	Kojonup... ..	179	2	50	24
					Greenbushes ...	6	2	46	16
					Bridgetown ...	4	3	42	21
S.W. INLAND :					SOUTH COASTAL :				
Kellerberrin ...	22	3	26	16	Mt. Barker ...	64	6	85	22
Meckering ...	12	1	21	19	Albany ...	72	8	79	32
Newcastle ...	41	2	25	29	Breaksea ...	42	11	67	19
Northam ...	3	1	25	28	Bremer Bay ...	27	4	68	24
York ...	17	2	34	32	Hopetoun ...	14	3	28	7
Beverley ...	14	1	35	26	Ravensthorpe ...	13	3	33	7
Brookton ...	<i>Nil</i>	...	...	...	Esperance ...	81	1	68	25
Wandering ...	25	2	18	20	Israelite Bay ...	7	3	74	24
Pingelly ...	22	3	34	18	Balladonia ...	5	2	55	18
Narrogin ...	<i>Nil</i>	...	46	17	Eyre ...	4	1	41	24
Marradong ...	4	1	19	11					
Williams ...	30	3	37	23					

*100 points=lin.

REMARKS ON THE RAINFALL FOR FEBRUARY, 1909.

The rainfall for the month has been in excess of the average for past years throughout the East Kimberley division and a narrow strip of country stretching from Murgoo in a south-easterly direction to Esperance, having Mt. Magnet and Boorabbin as its eastern boundaries, and Mullewa, Carnamah and Southern Cross on its western limit. The only other stations to show an excess are Wandering and Kojonup, both in the South-West, the latter place, owing to a heavy local thunderstorm on the 19th, recording an increase of 129 points above the average. The deficit is most marked at Fitzroy, in the West Kimberley, and on the North-West coast between Wallal and inland to Warrawoona. With the exception of a dry spell between the 3rd and 9th, thunderstorms were of almost daily occurrence in the Kimberley districts, heavy at places on the 17th, 18th, 24th, 25th, and 26th; Broome registering 224 points on the 18th, Wyndham 206 points on the 24th, Turkey Creek 451 and 233 on the 25th and 26th, and Hall's Creek 297 on the 25th. Throughout the west coastal districts and the Murchison and Coolgardie Goldfields, only a few light, scattered showers fell during the first half of the month, but on the 16th light to moderate showers were reported at stations in the Murchison, whilst on the following day light to moderate thundersorms fell at scattered places on the Coolgardie Fields, and light to heavy in the Murchison, the heavy falls being registered between Lemmonville, Yalgoo, and Murgoo.

From the 18th to the 22nd, light scattered thunderstorms were recorded over the Murchison, and, on the 20th, stations on the Coolgardie Fields registered light to heavy rain, Boorabbin recording 137 points.

Coming to the South-West districts, no rain fell there during the first week of the month, while only a few light scattered showers visited the south coast, but on the 19th and 20th light scattered rain was recorded throughout the South-West and South, in connection with a disturbance which rounded the Leeuwin, giving a cool change throughout south of the tropics. A few isolated showers fell the following day on the south coast, and on the 13th further light scattered showers on the south-west and south coasts, whilst from the 16th to the 22nd, light to heavy thunderstorms were recorded at isolated stations: Katanning registering 46 points on the 17th, Kojonup 163 on the 19th, Carnamah 63 on the 18th, and Esperance 81 on the 20th. From thence onwards only a few light showers fell, mostly confined to the extreme south-west and south coast-lines.

H. A. HUNT,
Commonwealth Meteorologist.

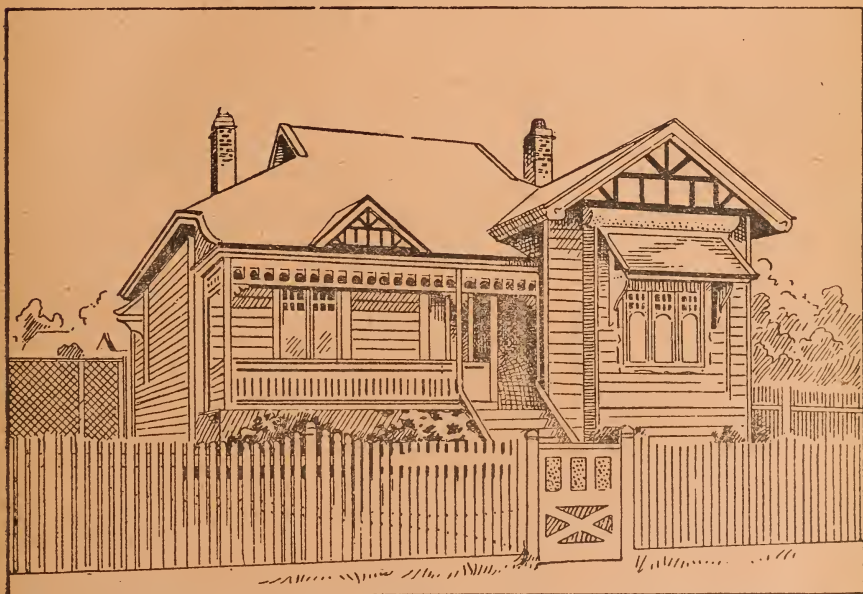
EDITORIAL REQUEST.

Correspondence and Queries are invited from subscribers and readers of the Journal on any subject of interest to agriculturists and other settlers on the land, either conveying useful information or seeking it. Suitable letters and contributions will be published and answers to queries given in the succeeding issue, if communications are received by the Editor not later than the fifteenth of each month.

Secretaries of Agricultural Associations, Societies, and Farmers' Clubs are kindly requested to supply corrections of the lists published in the Journal, such as changes of appointments, dates of shows and meetings, as well as any other items of interest.

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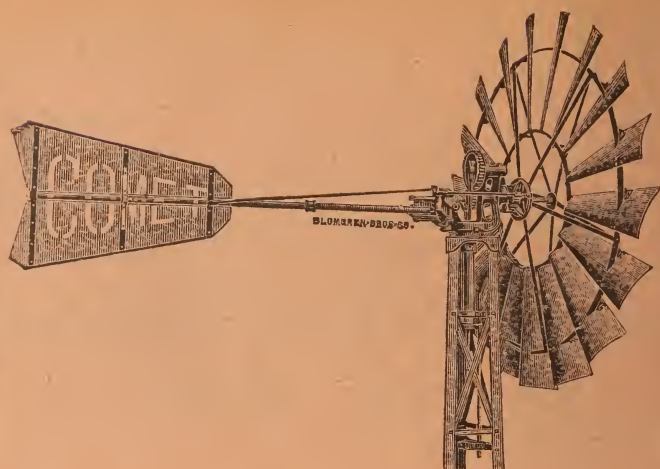
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Beverley Agricultural Society	G. Townley, Beverley
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Busselton Agricultural Society	A. R. Bovell
Cannington Agricultural and Horticultural Society	W. E. Cockram, Cannington
Donnybrook Agricultural Society	F. H. Layton
Geraldton Agricultural Society	W. Cassel Brown, Geraldton
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Pingelly-Mourabine Agricultural Society	A. A. Kent, Pingelly
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Swan Agricultural and Horticultural Society	H. A. Jevemish, Guildford
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Warin-Arthur Districts Agricultural, Horticultural, and Industrial Society	W. E. Clarke, Wagin
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Bedfordale Agricultural and Horticultural Society	T. W. Ottaway, Bedfordale
Boyanup Farmers' and Progress Association	W. Eccleston, Boyanup
Boyp Brook Agricultural and Vigilance Committee	Wm. Vincent, Boyp Brook
Brunswick Farmers' Association	John Partridge, Brunswick
Bullsbrook Progress Association	D. Strachan, Bullsbrook
Capel Farmers' Association	C. J. Rooney, Capel
Central Fruitgrowers' Association	A. Barratt, Perth
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Dangin-South Caroling Progress Association	W. G. Haines, Caroling, East Beverley
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Fremantle Horticultural Society	Hugh C. Anderson, Hon. Sec., c/o Union Stores, Ltd., Fremantle
Goldfields Dog, Poultry, and Horticultural Society	J. A. McNeill, Coolgardie
Goldfields Agricultural Society	Monmouth Smith, Kalgoorlie
Goomalling Farmers' Association	W. Gray, Goomalling, via Northam
Greenhills Farmers' Club	James McManus, Irishtown
Greenough Farmers' Association	J. McCartney, Walkaway
Harvey Farmers' Club	W. E. Ash, Hon. Sec., Harvey
Harvey Citrus Society	Kenneth Gibson, Harvey
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Jennapullen Agricultural Society	A. C. Morrell, Jennapullen
Jurakine Agricultural Society	W. Hayward, Jurakine
Kalamunda Horticultural Society	A. Sanderson, Kalamunda
Lake Pinjar Agricultural Association	H. Hartman, Pinjar
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Marbellup and District Settlers' Association	F. Mulineaux, Evergreen Valley Marbellup, G.S.R.

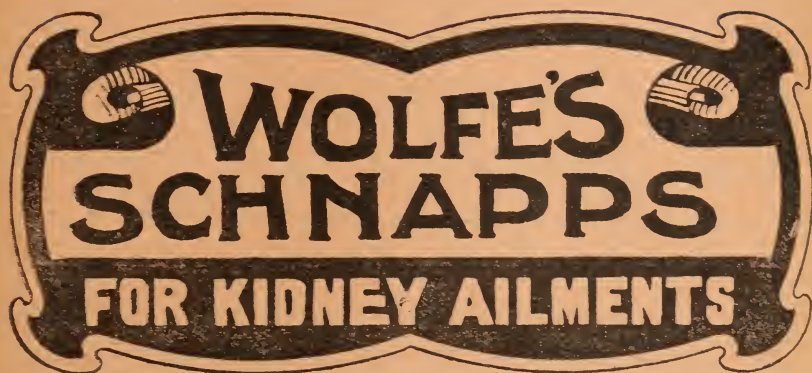
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Monwongie Progress Association	E. A. Batt, Monwongie, Popanyinning
Moonyoonooka Farmers' Association	W. H. Williams, Moonyoonooka
Murray Horticultural Society	Miss M. Alderson, Pinjarra
Newcastle Branch Bureau	W. A. Demasson, Newcastle
Newtown Progress Association	T. A. Thurlke, Woodlands, Vasse
North Greenough Farmers' Association	W. F. Stansfield, Bokenal
North Lake Progress Association	A. R. F. Johnston, c/o W. Lyons South Road, Fremantle
Parkerville Agricultural Society	S. Ramsay, Parkerville
Plantagenet Beekeepers' Association	Vacant.
Popanyinning Progressive League	F. R. Bayliss, Popanyinning Pool, G.S. Railway
Preston Progress Association	T. B. Jones, Preston
Quindalup Progress Association	W. E. Carter, Busselton
Spearwood Progressive Association	R. Barton, Hamilton-road, Spear- wood, Fremantle
Talbot Progress Association	O. Ryan, York.
Thomson's Brook Progress Association	J. W. Pudman, Thomson's Brook.
Toodyay Vine and Fruitgrowers' Association	W. A. Demasson, Newcastle.
Tenterden Agricultural Society	J. Lunt, Tenterden
Upper Chapman Farmers' and Fruitgrowers' Association	D. O'C. Kehoe, Narra Tappa
Victoria Plains Farmers' Association	J. Halligan, Summer Hill, Victoria Plains
Waigerup Agricultural Hall Association	W. J. Eastcott, Waigerup
Wandering District Agricultural Society	W. B. Smithson, Wandering
Wanneroo Farmers' and Gardeners' Association	F. J. Hollins, Wanneroo
Waterloo Farmers' Vine and Fruitgrowers' Association	T. W. Harris, Waterloo
West Swan Producers' Association	J. H. Stone, Guildford
Wongamine Farmers' Club	G. W. B. Smith, Wongamine
Wonnerup Progress Association	P. S. Brockman, "Reinseourt," Busselton
Woorloo Progress League	T. H. Ilbery, Woorloo
W.A. Beekeepers' Association	W. Potter, Goldsworthy Road, Claremont
Wagin Beekeepers, Poultry Fanciers, and Fruitgrowers' Association	F. A. Pfeiffer, Wagin.
West Albany Settlers' Association	Alfred Burvill, Grasmere, via Albany
West Coolup Progress Association	Stanley Caris, Pinjarra
West Pingelly Progress Association	J. J. Parker, Neta Vale, Pingelly.

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Claremont	C. H. Evans, Claremont
Collie	A. E. Smith, Collie
Coolgardie	J. S. Stewart, Council Office, Coolgardie
Fremantle	A. J. Parkin, Queen Street, Fremantle
Gingin	Chas. W. Johnson, Gingin
Kalgoorlie	H. R. Bristow, Kalgoorlie
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West Australian	Jas. Bolt, Hay Street.
West Australian Canary, Pigeon, and Bantam Club	Harry Barnett, 159 Barrack Street, City.
West Australian Minorca Club	E. J. Ford, Rockton Road, Claremont.

DATES OF MEETING OF SOCIETIES.

- Albany and District Settlers' Association—
At Torbay Junction.
- Armadale Progress Association—
Last Tuesday in each month, at 8 p.m.
- Boyanup Farmers' and Progress Association—
First Saturday in each month.
- Brunswick Farmers' Association—
Wednesday preceding full moon, at 8 p.m., at the Agricultural Hall.
- Capel Farmers' Association—
Last Saturday on or before the full moon, at 8 o'clock.
- Greenough Farmers' Club—
January, April, July (annual), and October.
- Jarrahdale and Serpentine Agricultural Society—
Meet the Saturday preceding the full moon, at 8 o'clock p.m., at the Agricultural Hall,
Mundijong.
- ROYAL AGRICULTURAL SOCIETY OF W.A.—
Second Tuesday in each month.
- Upper Chapman Farmers' and Fruitgrowers' Association—
Last Saturday in the months of December, February, April, July, August.
- W.A. Beekeepers' Association—
Second Wednesday in each month, Museum, Department of Agriculture, 7.30 p.m.
- Wanneroo Farmers' and Gardeners' Association—
Saturday on or before full moon, at Wanneroo State School.
- West Coolup Farmers' Association—
Second Saturday in each month, at 3 p.m., at Mr. Barry's residence.



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ALL GOODS GUARANTEED OF SUPERIOR QUALITY.

Buy from the Largest Manufacturer in the State and
SAVE MONEY. . . .

Head Office and Show Rooms:

87 BARRACK STREET.

Saddlers' Ironmongery and Factory:

179 MURRAY ST., PERTH.

AGRICULTURAL BANK.

ADVANCES TO FARMERS.

Advances are made under Section 28 of "The Agricultural Bank Act, 1906," for:—

- (a.) Ringbarking, clearing, fencing, draining, or water conservation.
- (b.) Discharging any mortgage already existing on holding; or
- (c.) The purchase of stock for breeding purposes,

ON THE SECURITY OF:—

- (a.) Holdings in fee simple; or
- (b.) Holdings under Special Occupation Lease or Conditional Purchase from the Crown; or
- (c.) Homestead Farms; or
- (d.) Such other real or leasehold property as the Trustees may think fit.

Advances may be made of an amount not exceeding £300 to the full value of the improvements proposed to be made.

Further advances may be made of an amount not exceeding £200 to one-half the value of the additional improvements proposed to be made.

No advance shall be made to discharge an existing mortgage to an amount exceeding three-fourths of the value of the improvements already made on the holding. The improvements recognised for this purpose are:—Ringbarking, clearing, fencing, draining, and water conservation. Advances are not made for "completion of purchase"; liabilities which have been incurred in the development of the security only being recognised.

At no time shall the advances to any one person (or number of persons if borrowing conjointly) exceed the sum of £500, and no sum exceeding £100 shall be advanced to any one person for the purchase of breeding stock. In applications for this purpose, the condition and capability of the security to successfully carry stock is of paramount importance.

Persons under 21 years of age, being unable to legally mortgage, are debarred from borrowing from the Bank.

Every application for an advance must be made on the Bank's forms, and shall contain all particulars required thereon.

Applications may be for sums of £25 or any multiple thereof, not exceeding £500. Each application must be accompanied by a valuation fee of 1 per cent. of the amount applied for. No refund of fee is allowed after an inspection of the security has been made.

Mortgages are prepared free of charge, but borrowers are required to pay the statutory charges in connection with their registration. These are:—

- (a.) Stamp Duty of 2s. 6d. for each £50 of the amount of mortgage up to £300; and
- (b.) A registration fee of 5s. for each Conditional Purchase or Homestead Farm Block mortgaged.

The Leases or Occupation Certificate, as the case may be, together with the above fees, must be in the possession of the Bank before a mortgage can be prepared.

NOTICES OF APPROVAL are insufficient for this purpose.

Intending borrowers are requested to note that no advances except for the specific purposes of discharging liabilities, or for purchasing breeding stock, are made against improvements effected prior to date of application. Applications should, in every instance, be lodged prior to commencement of work, and moneys are then paid over in progress payments as the work proceeds.

Repayments of loans extend over a period of 30 years, except in the case of stock advances, which have a currency of seven years only. Interest is charged at the rate of 5 per cent. per annum. payable half-yearly.

To the MAN ON THE LAND.

Are your Wife and Children fully provided for in case of your Death?
What would be their position with that advance from the Agricultural Bank undischarged?

Effect a Life Policy with the AUSTRALIAN MUTUAL PROVIDENT SOCIETY.

Follow the example of Hon. Jas. Mitchell, Minister for Agriculture, the holder of Policy No. 130373.

Actual Results:—

	£	s.	d.
Policy effected in December, 1885, under Table A for	300	0	0
Bonus additions to 31st December, 1906	175	18	0
Full sum assured to date	475	18	0

And Bonuses will continue to be added each year.

Annual Premium, £5 15s. Total Premiums paid to 31st December, 1906, £126 10s.

In case of death, the Society would Return as Bonuses the *Total Premiums Paid*, with a further sum of £49 8s. added. The full sum assured, £300, would also be paid to the member's representatives.

DELAY IS DANGEROUS. ASSURE AT ONCE.

DIRECTORS IN WESTERN AUSTRALIA:




HON. G. RANDELL, M.L.C., Chairman; JAS. MORRISON, Esq., J.P., Deputy Chairman;
JOHN F. STONE, Esq., J.P.; CHARLES HUDSON, Esq.

GAVIN LUCAS, Resident Secretary.

Office: ST. GEORGE'S TERRACE, PERTH.

District Office: Maritana Street, Kalgoorlie
(J. G. Holdsworth, District Secretary).

Local Agencies at Albany, Bunbury,
Geraldton, Northam, York.

 <h1 style="margin: 0;">Incubators</h1> 	
<p>ALL POULTRY, DOG, AND CAGE BIRD REQUISITES.</p> <p>Write for Catalogue.</p> 	<h2 style="margin: 0;">The Prairie State Incubator</h2> <p style="text-align: center;">Will hatch CHICKS or DUCKS.</p> <p>70 Egg, £3 5s. 115 Egg (Sand Tray), £5 10s.</p>
<p>JAMES GOSS, Wireworker, 711 Hay St., PERTH (Opposite Brennan's)</p>	

Perth's Fashionable Tailors Cut Suits to your Measure.

None but skilled and experienced workmen ever find employment in our cutting room. Cutting from measurements taken by the customer is necessarily more difficult and particular work than if we had measured you ourselves, but long experience has made our work wonderfully accurate.

**We guarantee Fit, Materials, Style and Workmanship.
Our Prices are absolutely Lowest for Reliable, Satisfactory Tailoring.**

A postal request will bring patterns and self-measurement form by return. Write to-day.

A. J. SHACKELL & Co., 698 Hay Street, Perth.

'Phone 1224. Box G, P.O. 26.

WESTERN AUSTRALIA.

Prominent Liberal Provisions in Land Laws

—AND—

CONCESSIONS TO SETTLERS.

1. A Homestead Farm of 160 acres. Application fee, £1; survey fee, £3; stamp, 1s. Conditions: Personal residence for six months in each of the first five years after survey, or residence on C.P. lands within 20 miles. Boundaries: Half to be fenced within five years; the whole within seven years. Improvements: 4s. per acre must be expended in the first two years, 6s. per acre during next three years, 4s. per acre during last two years, making total of 14s. per acre in seven years.

2. Conditional Purchase Lands.—From 100 acres to 1,000 acres at from 10s. per acre, payable in 40 half-yearly instalments at the rate of 3d. per acre. Conditions: Personal residence, for 5 years, one-tenth of boundaries to be fenced within two years, the whole within 5 years, and improvements to the full value of purchase money to be made within 10 years. Half the value of boundary fence may be allowed in estimating value of improvements. Conditional Purchase Lands may also be selected without the condition of residence, in which case the improvements in value must equal one and half the amount of the purchase money, but not exceeding £1 10s. per acre.

3. Land for Orchards, Vineyards, or Gardens, from 5 to 50 acres, from 20s. per acre, payable in three years. Improvements, including fence, to be completed in three years.

4. Full particulars as to conditions, areas, and further methods of obtaining land will be found in the pamphlet "Selector's Guide," obtainable on application to the undersigned.

5. Surveys are carried out by the State at half cost to selectors.

6. The Agricultural Bank renders monetary assistance to enable settlers to effect improvements when land has been substantially fenced.

7. On a selector proceeding to any district for the purpose of selecting land, the nearest Land Agent will supply all information, plans, and pamphlets, as well as a guide to conduct him to available land free of charge. In the event of an application for land being made, with the necessary deposit, a refund of railway fare may be obtained, if the deposit on land selected is equal to 50 per cent. more than the amount of the fare, and provided the application for refund is supported by a certificate from a Government Land Agent stating the place from which the selector proceeded for the purpose of selecting.

8. The Railway Department grants a special concession in the way of fares and freights for a new selector's family and goods, on production of a certificate of *bona fides* from the Lands Department. Any selector of an area of not less than 500 acres first-class land may obtain from the Lands Department an order for railway tickets and freight for his family, goods, and chattels, from the station nearest his present or late residence to the station nearest the land selected, the amount to be repaid to the Department by the selector by bills at 12 and 24 months, with 5 per cent. interest added; until the bills are paid the land cannot be transferred or mortgaged except to the Agricultural Bank.

9. Any new selector residing on his land can arrange passages for his wife and family to this State through the Colonial Secretary's Department.

10. Agencies are established at Menzies, Coolgardie, Kalgoorlie, Southern Cross, Cue, Northampton, Geraldton, York, Northam, Beverley, Newcastle, Bunbury, Katanning, Albany, Bridgetown, Busselton, Narrogin, Wagin, Pingelly.

R. CECIL CLIFTON,

Under Secretary for Lands.

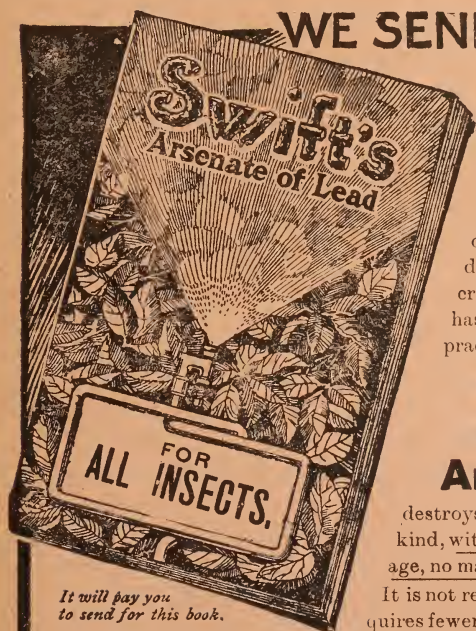
Perth, Western Australia.



FOR
PIGS.

The flavour and keeping qualities of the flesh are influenced for good or evil by the food.

Sunlight Oil Cake imparts to the flesh a firmness and a proper proportion of fat to lean, and the flesh has a flavour imparted to it that is delicate and delicious.



WE SEND THIS BOOKLET
FREE.

To every Fruit Grower, who wants to increase his profits 25 to 30 per cent. by ridding his orchards of the insect pests that damage them and decrease the crops. The demand for this book has been very great, showing its practical value.

Swift's Arsenate of Lead

destroys all leaf-eating insects, of every kind, without burning or scorching the foliage, no matter how strong a solution is used.

It is not readily washed off, and therefore requires fewer applications than any other spray

*It will pay you
to send for this book.*

—less labor, smaller expense, larger crops, greater profits. Used and recommended by leading fruit-growers, orchardists and shade-tree owners everywhere.

It is White. It Sticks to Foliage. Can't Burn or Scorch.

F. H. FAULDING & CO., 341 Murray St., PERTH.

AGRICULTURAL BANK.

* * * * *

Advice to Applicants

* * * * *



Intending clients of the Bank are requested to note the following directions, particularly with

regard to anticipating their requirements. By so doing much of the inconvenience from delays, which are at present unavoidable, may be obviated:—

DON'T DEFER making application until you are in financial difficulties. With ordinary foresight you should be able to anticipate your requirements by at least two or three months. If you are in any doubt as to being able to tide over the unproductive stages of development, put in an application before you start your improvements. If the request is a reasonable one you can confidently look for assistance, and, in the event of approval, the proposed work effected since date of application is paid for. It should be clearly borne in mind that the Bank does not pay against work done prior to that date.

As soon as you have lodged an application, see that the Leases or Occupation Certificate, as the case may be, of the security offered are in your possession, and ready for production when required. If these have not been issued you should apply at once to the Under Secretary for Lands.

Notices of Approval are not sufficient for the purpose of a mortgage.

No moneys can be paid over until a mortgage over the security offered has been completed. This is prepared free of charge and forwarded for signature as soon as an application has been approved in Executive Council, provided the security has in the meantime been completed, and a registration fee of 5s. paid on each Conditional Purchase or Homestead Farm block, with stamp duty of 2s. 6d. for each £50 of the amount of mortgage.

For further directions see page viii.

May be you like Saving Money?

IF SO,

I can Help.

I have just received a portion of my Melbourne-made Stock, which was delayed.

It comprises—

Ladies' real Chrome Glace Kid Oxford Shoes.

Ladies' real Chrome Glace Kid Button Shoes.

Ladies' real Chrome Glace Kid Lace Boots.

Ladies' real Chrome Glace Kid Button Boots.

NOTE that little word KID; it does not mean the skin of the giddy ~~bar~~ lamb, but KID, good tough KID, with a glace surface, and it wears well with 2 big W's.

Don't forget EZYWALKIN'S Melbourne-made Goods are genuine, and are building his trade.

Also to hand—

Melbourne-made Men's Boots in Tan and Black from 8s. 11d. to 16s. 6d.

EZYWALKIN'S GREAT SPECIALTIES.

Melbourne-made Boots and Shoes sound, durable, and neat. Boots and Shoes that can look at a bale of brown paper and know they are NOT related.

See here 2 lines—

Ladies' Glace Kid Ada Shoes, elysium for tired feet, 8s. 11d.

Ladies' Glace Kid Oxford Shoes, 6s. 6d.

Both made of Chrome Glace.

SPECIAL FOR THIS MONTH.

Men's No. 86 Tan Willow Calf Balmoral, welted, with round toe, 12s. 6d.

Truly

EZYWALKIN

Is a Friend to the Pockets.

Avoid the High Tariff and wear

EZYWALKIN'S MELBOURNE-MADE BOOTS & SHOES.

You will never regret it.

F. E. Randell & Co.

Produce Merchants,
338 WELLINGTON STREET, PERTH.

PRIME CHAFF, WHEAT, BRAN,
POLLARD, OATS, ETC., ALWAYS
—ON HAND.—

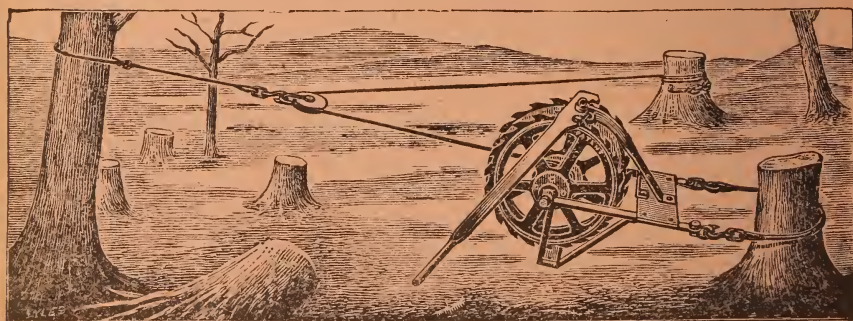
Sole Agents for . . .

Seccombe's Famous Hand-shaken Paspalum Seed.

FARMERS, ORDER EARLY TO AVOID DISAPPOINTMENT.

"BUNYIP" TREE PULLER

SIMPLE. EFFECTIVE. PORTABLE.



Complete with Cables, Block, Lever, and Extension Lever.
Price, £20.

GEO. P. HARRIS, SCARFE & CO., LTD.,
MURRAY STREET, PERTH.

Stock, etc., for Sale.

NARROGIN STATE FARM.

10 2-TOOTH LINCOLN RAMS (our own breeding). Very nice lot for breeding and quality. From 3 to 4 guineas each.

14 LINCOLN RAMS, 4 and 6-TOOTH (imported from Eastern States). In different lots. 2 to 3 guineas each.

6 SHROPSHIRE RAMS, 2-TOOTH (our own breeding.)

6 2-TOOTH SHROPSHIRE RAMS at 3 Guineas.

2 2-TOOTH LINCOLN RAMS at 3 Guineas.

4 4-TOOTH LINCOLN RAMS at 2½ Guineas.

2 6-TOOTH MERINO RAMS at 3 Guineas.

18 2-TOOTH MERINO RAMS at 4 Guineas.

Following Seeds :— LINSEED FLAX, INDIAN GRAM, PHALARIS COMMUTATA, AND OTHERS.

SEED WHEAT. MALTING BARLEY.

3 DEXTER-KERRY BULLS. 4 ANGORA BUCKS (2-TOOTH).

BERKSHIRE PIGS—YOUNG BOARS AND SOWS.

M. YORKSHIRE PIGS—YOUNG BOARS AND SOWS.

POULTRY—

WHITE LEGHORNS

BUFF ORPINGTONS

BROWN LEGHORNS

MINORCAS

PLYMOUTH ROCKS

SILVER WYANDOTTES.

PEKIN AND INDIAN RUNNER DUCKS.

TOULOUSE GEESE. TURKEYS.

For particulars apply to the Manager,

R. C. BAIRD.

BRUNSWICK STATE FARM.

FIVE YOUNG BERKSHIRE BOARS, 12 weeks old, by "Ringleader," out of pedigree sows.

Apply to Manager.

Journal of the Department of Agriculture.



Issued Monthly.

SCALE OF CHARGES FOR ADVERTISEMENTS.

	£	s.	d.
Full page, per single issue	2	0	0
„ „ 6 months' contract	10	4	0
„ „ 12 „ „	18	0	0
Half page, per single issue	1	5	0
„ „ 6 months' contract	6	15	0
„ „ 12 „ „	12	15	0
Quarter page, per single issue	0	15	0
„ „ 6 months' contract	4	5	6
„ „ 12 „ „	8	6	6

The following discounts will be allowed in cases where advertisements are paid for in advance:—

7½	per cent. discount when paid 12 months in advance.
5	„ „ 6 „ „
2½	„ „ 3 „ „

TENT, WATERBAGS, . . .

. . . TARPAULIN, . . .

FLAG MANUFACTURER.

TRADE SUPPLIED AT LOWEST RATES

Flags, Tents, and Marquees for Hire.

J. H. Graham,

69 Lindsay St.

(Late of Barrack St.),

Telephone 857.

PERTH.

STEEL WINGS

Patented
throughout
the World.



Some Exclusive Features.

DOUBLE CRANKS,
DOUBLE SPOKES,
DOUBLE
BEARINGS,
DOUBLE POWER,
EVERLASTING
LIFE.

Send for

**Steel Wings
Pamphlet.**

Made in Western
Australia
and Sold with a
Guarantee.

**The Bullock
Electric
Mfg. Co.,**

859 and 861
HAY STREET.

GEORGE WILLS & Co.,

MURRAY STREET,
PERTH,



Have supplied
more than half
State's require-
ments for the
past 10 years.

Quality as high,
Price as Low
as ever. - -

—*—
DEERING
MACHINERY
AND
PRODUCE
AGENTS.

Chaff and Grain Auctioneers.

Head Office: FREMANTLE.

BRANCHES at PERTH,
NORTHAM, KALGOORLIE,
YORK & GOOMALLING.

The LARGEST CHAFF
AUCTIONEERS in the State

Promptest
Settlements !
Highest
Prices !

H. J. Wignmore & Company,
LIMITED

SOLE
AGENTS

... FOR ...

CUMING, SMITH,
& CO.'S PROP., LTD.,

HIGH-GRADE

"Sickle" Brand Manures.

FLORIDA SUPERPHOSPHATE

(Runs Freely through any Drill).

Also Dissolved Bones Super, Nitrogenous Super,
Bonedust & Super Mixed, Bonedust, Bone Meal, etc.

BRAN BAGS, CORN SACKS, and all farmers' requisites
always on hand.

Sole Agents for WM. THOMAS & Co., Millers,
NORTHAM AND PINGELLY.

When visiting Perth,
we recommend . . .

THE SHAFTESBURY HOTEL,

in Stirling
Stre

Noted for comfort and moderate charges.

630.5
Vol. XVIII

Part 4.

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PRICE 6^d

Journal of the Department of Agriculture



WESTERN AUSTRALIA

APRIL.

1909.

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Registered at the General Post Office for transmission by Post as a Newspaper.

Notice to
Farmers . .

We are buyers
— of —
Prime Quality

Wheat

— At —
Highest Prices.



Notice to
Storekeepers
Bakers, etc.

We are sellers
— of —
. High Class .

Flour

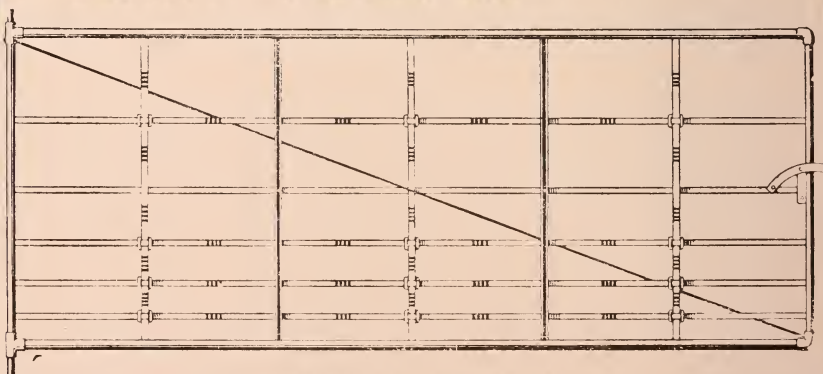
At —
Lowest Prices.

COMMUNICATE WITH

WESTRALIAN UNION FLOUR MILLING Co., Ltd., Fremantle

THE
“PURSER”
PATENT.
THE LATEST THING IN GATES.

Made in various
styles suitable for
Farm, Station, or
Residence.



This Gate is as light on the Hang-
ing and as cheap as a Wire Gate,
with the strength and substantial
appearance of a Bar Gate, made in
any size and with any number of
bars desired. Supplied complete,
hangers and self-closing catch, with
provision for padlock.

SEND FOR PRICES AND PARTICULARS—
Patentees and Manufacturers—

RICHARD PURSER & CO..

King Street, Perth.

PEERLESS ROLLER FLOUR,

Highest Perfection Obtainable.

**SECURED FIRST AWARD ROYAL SHOW, 1908,
AND SWAN SHOW.**

Would recommend buyers
to ask for Peerless brand
to ensure the best.

Buyer of Farm Produce,
General Merchant and
Importer.

Lowest Quotations for Chaff Bags and Corn Sacks.

WM. PADBURY,
Guildford.

STEWARTS AND

LLOYDS, LTD.,

Makers of . . .

W.I. Tubes and Fittings

(For Wind-mills, Irrigation
Work, etc.),

Valves,

Steel Plates,

Boiler Tubes.



NOTE.—We have the
largest stock of Tubes and
Fittings in Australia,
SELL DIRECT TO THE CONSUMERS.

Small Orders and Large Orders receive
prompt attention.

inquiries quickly answered.

West Australian Offices and Stores:

PERTH, FREMANTLE, KALGOORLIE,

Surrey Chambers. Lord Street. Boulder Road.

Fresh Supply Received

SNAKE BITE OUTFIT

1s.; Posted 1s. 2d.

Have you received our
Drug Catalogue?

Post Free on applica-
tion.

A. L. TILLY,

CHEMIST,

728 Hay St., Perth

**SEE
THAT
YOU
GET**



Dear Sirs We have used
ROW'S EMBROCATION for the last
30 years and have found it one of
the most useful remedies for horses.

If this is any use in securing
sales you are welcome to it.

Yours sincerely,

FITZGERALD BROS. CIRCUS PROPRIETORS

Edw^d ROW & CO., SYDNEY,
— SOLE MAKERS. —

*Settlers and Others who contemplate Building will study their own
Interest best by securing*

LYSAGHT'S "ORB" OR "REDCLIFFE" GALVANISED IRON

OF ENDURING BRITISH MANUFACTURE,

For **ROOFING PURPOSES**, as those brands have been tested on the World's Markets
for nearly 40 years, and have given **UNIVERSAL SATISFACTION** to users
both for **ECONOMICAL** reasons and perfect **RELIABILITY** as to
general uniform **EXCELLENCE** of Manufacture.

"QUEEN'S HEAD" FLAT IRON ranks first for making up purposes.
SPECIAL LARGE HEAVY SHEETS FOR TANKS AND VATS.

OBTAINABLE FROM IRON AND TIMBER MERCHANTS THROUGHOUT THE STATE.

YORKSHIRE INSURANCE COMPANY, . LIMITED. .

ESTABLISHED 1824.

Authorised Capital - £1,000,000.
Reserves exceed - £2,000,000.

Head Office - - - YORK, ENGLAND.

CHIEF OFFICE FOR WESTERN AUSTRALIA :

McNeil Chambers, Barrack-st., Perth.



DEPARTMENTS :

FIRE. LIFE. ACCIDENT.
EMPLOYERS' LIABILITY.

BURGLARY.

LIVE STOCK INSURANCE.

*Transit Risks by Sea and Rail
promptly arranged.*



LIVE STOCK DEPARTMENT:

HORSES AND CATTLE.

All risks of mortality, including destruction in the interests of humanity.

STALLIONS.—For season or twelve months.

IN-FOAL MARES.—For short periods or twelve months.

FOALS.—Against risk of being born dead or dying after birth.

PEDIGREE BULLS.—For short or long periods.

PEDIGREE COWS (including calving risks).—For thirty days or twelve months.

BLOOD STOCK.—Including risks of racing.

HUNTERS.—Special scheme, including depreciation.

MASSEY-HARRIS

CULTIVATORS, PLOWS, HARROWS,

GRAIN AND FERTILISER DRILLS,

CONSTITUTE A FULL LINE OF

**High-grade Tillage and Seeding
Implements and Machines.**

Agents at all centres, who carry stocks of extra parts for
ALL MASSEY-HARRIS MACHINES.

Western Australian Headquarters :

730 WELLINGTON STREET, PERTH.

F. H. Faulding & Co

WHOLESALE DRUGGISTS and
MANUFACTURING CHEMISTS

Best House in W.A. for ...



BLUESTONE

(English), Guaranteed Strength.

SULPHUR, PARIS GREEN

SULPHATE OF AMMONIA

SEAMING TWINE

VETERINARY INSTRU-

MENTS & REMEDIES

BORDEAUX MIXTURE

(Dry powder containing 55 to 60 per cent. Sulphate of Copper) for Mildew, Black Rot, etc.

GREEN SULPHUR

(More efficacious than ordinary Sulphur) destroys Caterpillars, Snails, and other Parasites of Agriculture.

Agents for...

SWIFT'S ARSENATE OF LEAD, packed in suitable containers from 1lb. to 1cwt.

SINGER'S EGG PRODUCER.

Correspondence
Invited.

WELDARINE.

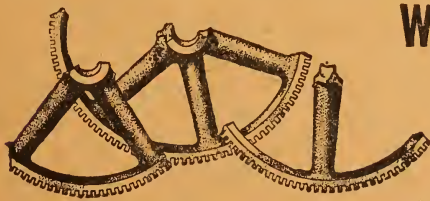
INSURE AGAINST SERIOUS LOSS THROUGH A BREAKDOWN!

Everybody who uses Tools or Machinery has something broken occasionally.

The Farmer in the midst of his harvest, loses a part of his crop because he has to wait for repairs.

The Manufacturer loses hundreds of pounds, while machinery lies idle, for a part that costs only a few shillings to repair.

WELDARINE IS QUITE EASY TO USE. EVERY SET IS COMPLETE.



Before Welding.

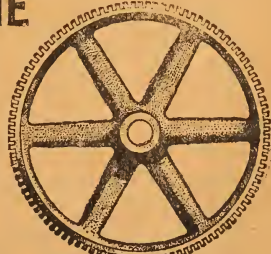
WELDARINE

IS

GUARANTEED
TO WELD
CAST-IRON.

Large Set,
complete, 25/-
by post, 26/6
Small Set,
complete, 15/-
by post, 16/3

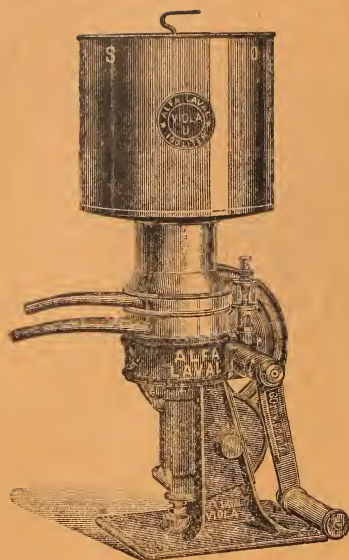
Full instructions
with every set.



After Welding.

STOCKED BY ALL STOREKEEPERS.

JOHN J. HORROCKS & Co., Ltd., PRINCES' BUILDINGS,
PERTH, W.A.



**YOU - ARE LOSING -
MONEY**

BY NOT USING THE NEW IMPROVED

**SPLIT
WING**

ALFA-LAVAL

SEPARATOR.

HOLDS THE WORLD'S RECORDS FOR 

**EASY RUNNING
CLEAN SKIMMING
DURABILITY.**

WRITE FOR CATALOGUE
TO SOLE AGENTS:

- - **GARDNER BROS.**

**LAWRENCE-KENNEDY MILKING MACHINES.
TAYLOR'S CALF FOOD. MOLASSINE. OIL CAKE.**

MOUNT LYELL SUPERPHOSPHATES

HAVE PROVED BEST BY TEST. FARMERS BELIEVE THIS.

They are again placing Orders for Coming Season.

BEST BECAUSE: HIGH ANALYSIS, FREE RUNNING, FULL WEIGHT IS GUARANTEED.

REGULAR SHIPMENTS ARRIVING WEEKLY.

SEEDS THAT SUCCEED.

SEND FOR NEW SEASON'S PRICE LIST OF GRADED

**WHEAT, OATS, BARLEY, RYE, PEAS, VETCHES, RAPE,
VEGETABLE, and GRASS SEEDS.**

Sole Agents:

NEW "ROBINSON COGLESS" DRILLS.

"KING" STUMP-JUMP DISC PLOWS. "ZEPHYR" STUMP-JUMP PLOWS.

"SUPERIOR" DRILLS. DISC HARROWS.

"PLANET, JR." IMPLEMENTS. CHAFF-CUTTERS.

HORSE WORKS. SCOOPS.

GARDNER BROS.,

609 Wellington Street, Perth,

AND AT FREMANTLE AND MELBOURNE.

AGRICULTURAL BANK.

LOANS to FARMERS.

UNDER THE AGRICULTURAL BANK ACT, 1906

(which repeals all prior Acts),

Advances, not exceeding in the aggregate £500, are made to Farmers and Cultivators for the following purposes:—

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" Potash	0 10 0	0 5 0
" Water soluble phosphates	0 10 0	0 5 0
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" Insoluble phosphates	0 10 0	0 5 0
" Lime... ..	0 10 0	0 5 0
" Sulphate	0 10 0	0 5 0
Complete analysis	1 10 0	0 15 0
Albuminoids	0 10 0	0 5 0
Oil	0 10 0	0 5 0
Fibre	0 10 0	0 5 0
WATER—		
For irrigation	1 0 0	0 5 0
Complete analysis	3 0 0	1 0 0
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For each soil	2 0 0	1 0 0
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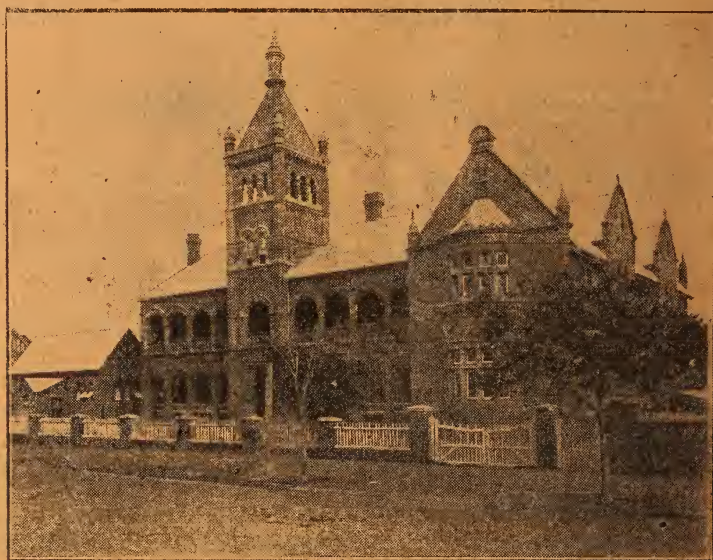
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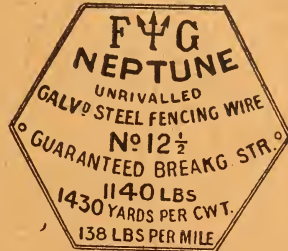
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JOURNAL
OF THE
DEPARTMENT OF AGRICULTURE
OF
WESTERN AUSTRALIA.

By Direction of
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JOURNAL

OF THE

Department of Agriculture

OF

WESTERN AUSTRALIA.

Vol. XVIII.

APRIL, 1909.

Part 4.

NOTES.

Peanut Oil.—In Europe a first-class peanut oil is the most highly esteemed of vegetable oils after olive oil. It is also used in the manufacture of butter substitutes. The low-grade oils are used for soaps.

New Zealand's Estimated Grain.—The estimated yields of grain for threshing in New Zealand this season are as follows:—Wheat, 33 bushels per acre; total, 8,328,903 bushels. Oats, 42 bushels per acre; total, 17,095,554 bushels. Barley, 34 bushels per acre; total, 1,661,002 bushels.

Fifth Egg-laying Competition.—The Fifth Egg-laying Competition, under the auspices of the Department, will commence on May 1st, and be held at the Quarantine Grounds of the Department, Subiaco, situate about 300 yards from West Subiaco Railway Station. The Competition will run for twelve months, to 30th April, 1910.

The Fruit-fly.—Mr. G. W. Wickens, Orchard Inspector, Bridgetown, reports that he has discovered no traces of the fruit-fly in his district since the summer of 1907. A number of orchards in the Preston were infected in that year, and the orchardists in that district then pursued a vigorous and constant search for the pest, which resulted in its destruction.

Value of Alfalfa for Young Horses.—The most successful breeders of both heavy and light horses in America are to-day using alfalfa extensively in the development of their young horses. A fifteen-hundred pound horse, doing steady work, should have about 4lb. of hay with his morning feed, and the same amount at night. Many horses will eat 30lb. or 40lb. of hay a day if they have free access to it.

Australian Wines in England.—Acceding to the request of the Hon. J. W. Taverner, Agent-General for Victoria, who is moving with a view to safeguard the interests of the producers of Australian wines, which carry a greater proportion of alcohol compared with the French, Mr. Winston Churchill, President of the Board of Trade, has decided to hear the Australian objections to France's overtures for a new treaty in favour of the wines of that country, to facilitate her in exporting thin wines to Great Britain.

To Destroy Ragwort.—A contributor to an exchange supplies the following as an infallible means for destroying the ragwort pest:—"Common salt is a deadly enemy. The way to apply it is to cut the plant off level with the ground (not to dig the roots out) and apply the salt liberally to the cut part. The salt thus sinks into the neck and fine, fibrous roots of the plants, and destroys its vitality. I have tried many ways of dealing with it, and the above is the only effective one. Digging or hoeing it out makes it worse."

Orchards and the Fruit-fly.—In his report for the past season, Inspector J. S. Jefferson states that he visited the orchards in Australind, Mandurah, Pinjarra, Bunbury, Picton, and Cookernup districts, in most of which the fruit-fly was troublesome two years ago, but were now found free of the pest: only in a few instances were any trees and fruit slightly infected. In some cases kerosene traps were used, but not systematically, but where care and method were fully observed the best results followed.

Wheat Pickle.—Enquiries are made by agriculturists regarding the use of formalin as a fungicide for pickling seed wheat. The formalin used is the ordinary 40 per cent. solution known in commerce. The following strengths are used:—

For Potato scab:—Formalin, $\frac{1}{2}$ pint; water, 15 gallons.

For Smut in grain:—Formalin, 1 pint; water, 50 gallons.

Dip the potatoes or grain in the sacks for a few minutes and then allow to drain. In the Journal of the Department for April, 1908, on page 315, will be found fuller information on the pickling of wheat.

A Waterproof Whitewash.—A German paper gives the following formulæ for whitewash, which can be applied to lime walls, and which afterwards becomes waterproof and bears washing. Mix together the powder from three parts of silicious rock (quartz), three parts of broken marble and sandstone, also two parts of freshly-slaked lime, still warm. In this way a wash is made which forms a silicate if often wetted, becoming after a time almost like stone. The four constituents mixed together give the ground colour to which any pigment that can be used with lime is added. It is applied quite thickly to the wall or other surface, let dry one day and the next day frequently covered with water, which makes it waterproof. The wash can be cleansed with water without losing any of its colour; on the contrary, each time it gets harder, so that it can even be brushed, while its porosity makes it look soft. The wash, or calcimine, can be used for ordinary purposes, as well as for the finest painting.



Emanuel Building, showing the Ceylon Bureau, St. George's Terrace,
Perth, W.A. (*see* page 306).

STOCK AND CROP RETURNS.

Mr. Malcolm A. C. Fraser, Government Statistician of Western Australia, has received the following reports from the several districts in the State of the state of crops and live stock for this year.

SOUTH AND SOUTH-WEST DISTRICTS.

Albany.

Constable O'Brien writes relative to the returns for the town of Albany and its vicinity, as follows:—"The few Chinese market gardens in the suburbs turned out very satisfactory to the owners. Vegetable growing at Albany pays very well, as the soil and climate are suitable. Poultry farming also pays very well here, but owing to the very high price of wheat during 1907 and 1908 poultry-keeping has not been so successful."

Constable Mercer, reporting on the King and Kalgan River district, Nanarup, Two People Bay, Millbrook, Woodburn, Eastwood, Grassmere, Torbay, Marbellup, Denmark, and Parry's Inlet, Wilson's Inlet, Mullikup, Hay River, Chockerup, and Perth Road for a distance of 28 miles west of Albany, writes:—"I found the settlers ever ready to assist me in every possible way with information, yet a very considerable amount of delay was incurred through not finding them at home. The holder is as a rule working on his land some considerable distance from his house, and by the time his wife or other member of the family has brought him to the house the best part of an hour has passed by. A good deal of time was also taken up by having the electoral rolls added to the statistical work this year. The principal products grown in this district are fruit and vegetables. The settlers are now going in for growing potatoes, and with a fair amount of encouragement would, I believe, be able to supply the requirements of the State in that kind of vegetable; cabbage grows luxuriantly also. Market gardeners complain of the want of a market for their produce. The fruit crop is very satisfactory, but prices are low. Vegetables are not so good this year, on account of the long spell of dry, hot weather, but the recent rains on the 2nd and 3rd inst. will do much for the vegetable crop. A large number of small farms have been selected during the past two years, but much work has not been done on them, as the clearing is very expensive. In my opinion a great future is in store for this district in the dairying line, as the country is most suitable for it, once it is cleared and cultivated. A small creamery and butter factory erected at or near Denmark would do well, and also do a lot for the surrounding district. Milch cows do well about here."

Busselton.

Constable Poyser writes:—"I respectfully report, for the information of the Government Statistician, having collected the crop and stock returns for Busselton district, an area of about 100 by 100 miles, the greater portion consisting of large leasehold areas recently reduced in size by new selectors.

who invariably say that they are well satisfied with their homesteads and their future prospects. The whole district is accessible by good roads. The new railway just completed connecting Busselton with Nanup, 40 miles inland, is certain to benefit the inland portion of this district in many ways, as a great deal of farm produce will be required to supply local demands at the timber mill, now being erected. Stock owners have, as usual, removed their stock from inland to their coastal runs, chiefly owing to scarcity of feed, or to the prevalence of rickets, caused by eating the well-known *zamia* palm. Karridale has the highest record of rainfall in this State during 1908, which is 4,719 points, being 288 points higher than the previous year. Busselton and inland registered 3,335 points, being 356 points higher than the previous year. Cape Naturaliste registered 3,132 points, being 133 points below the previous year's rainfall, and Cape Leeuwin registered 3,577 points, being 48 points below the previous year's register. It is to be regretted that most of the rain fell during winter, as the past summer has been a remarkably dry one, which may to some extent account for the heavy losses in cattle that have died from a disease known as "dry paunch" or "enlarged gall," and rickets. The oaten hay crops this year have in most cases yielded satisfactory returns; very few farmers grow any wheat in this district. The potato crops were exceptionally good last year, and keen competition amongst the growers was caused by the prizes offered at the National Show, held at Busselton, and many farmers not only raised heavier crops, ranging from 7 to 10 tons per acre, but benefited, some to the extent of £20, in prizes won at the Show. The orchards have given very satisfactory returns in all cases, but the growers' complaint is that they are unable to dispose of fruit at satisfactory prices, consequently a good deal of marketable fruit is wasted. One farmer only made an attempt to make ensilage, and he was very well rewarded for doing so. The advancement of this district may be gauged and is proved by the fact that the butter factory returns for 1908 are considerably above those of the previous year, notwithstanding the exceptionally dry summer during 1908. In reference to sheep, there are not many settlers who have gone in for sheep breeding. The wool clip this year has, however, been so satisfactory that a very great deal of ring-barking has been done recently by settlers who intend giving sheep a trial on a larger scale in future. One farmer lost 30 sheep through blow-flies, but saved the remaining 20 by using Cooper's dip. There is an increase in the number of sheep compared with the previous returns for this district, and settlers have much confidence in their future prospects as regards wool growing and sheep breeding. Only one experiment has so far been tried with Angora goats, which was not a success; but other cross-breds thrive very well."

Bridgetown.

Constable Thurlow writes:—"I have to report that the statistical returns for the Bridgetown police district are now completed. During my travels the following localities were visited:—Jaye's, Scott's Brook, Tweed Area, Upper and Lower Warren, and Grange districts. I find that most of the settlers are going in for mixed farming, sheep and cattle and fruit-growing, whilst in one or two instances horse-breeding has been successfully attempted. The fruit crop this season is an exceptionally heavy one, but the growers complain much of the low prices received for their fruit. The general feeling is that if there were some way of using up the second-grade fruit the producer would receive

a higher market price for the first-grade. At the present time a good deal of the second-grade goes to waste, whereas if a local jam and preserving works were established it could be all profitably used up. In some instances growers have carted their fruit from 30 to 50 miles to the Bridgetown railway for transit to the Perth markets, and the prices then received have not even paid for freight, consequently in some cases the producer has found himself in debt when he has received the returns for the consignment. What is at present perplexing the orchardists is how they are going to dispose of their fruit when the young trees lately planted come into bearing, as in this district alone there are 96,534 young trees that will be bearing additional fruit within the next three or four years. Nearly every kind of fruit thrives in this district. Respecting vegetables, I noticed that most of the settlers I visited had a kitchen garden, where they grow a varied assortment of vegetables for their own use. I have not met with any market gardens. Potato crops were not as good this year as in previous years, on account of the late frosts, which, unfortunately, caused many failures. The cereal crops are mostly oats and wheat grown for hay. The area under crop was larger this year than in previous years, but the results were not so good per acre, on account of the late frosts and the exceptionally dry year, the rainfall for the year, 29in. 94 points, being 3in. 4 points below the average rainfall. Sheep-breeding has been very successfully carried on during the year, and a high percentage of lambs has been reared. The wool clip has also been very satisfactory, whilst fats realised high prices in the markets. In some parts of the country the blowfly has been very prevalent, and has been the cause of a heavy mortality amongst some of the local flocks, one owner in particular being a very heavy loser. Dairying is not carried on to any extent. For three or four months of the year the farmers made butter, but even then mostly for their own use. Cattle-raising is attended with fair results, the great drawback at the present time being the presence of the zamia palm. But that will be overcome in time, as most of the settlers are now destroying it with the aid of kerosene."

Broomehill.

Constable D. Stevens, reporting on the Broomehill sub-district, writes:—"I report having completed collecting agricultural and pastoral returns on March 17 for this sub-district. Crops this year have not been as good as usual. East of Broomehill there is some splendid land for wheat-growing; the average in that portion of the district is about 18 bushels of wheat and 25 bushels of oats per acre. West of the railway line the crops are very bad; in some cases, as around Tambellup, the farmers did not even get their seed back. They state the cause of failure to be frost, but anyone who saw these farms would probably say that the ground had not been properly ploughed. Stock is increasing this year: 77,784 sheep were shorn, giving a return of 746,167lbs. of wool. This sub-district should in the course of a few years contain a considerable number of small sheep stations. The stock has lately greatly improved in quality, as some splendid dairy cows have been imported, and also some very valuable sheep. Fruit-growing this year has, unfortunately, not been very successful, as the heavy frosts cut a great quantity of the fruit off. Taking it all round, this has been a disastrous year for the small farmers, especially as they now have no mallet bark trade to fall back on in the off-season, and consequently some of the small farms are for sale. In some cases several of these smaller holdings are being amalgamated into sheep runs."

Collie.

Constable J. A. McGrath reports:—"I have to report that the collection of the crop and stock statistics for this district is now completed. As a result of observations and from information gleaned while engaged in collecting the returns, I have formed the opinion that the past season, from an agricultural point of view, has not been a successful one. The wheat and oat crops have in every instance yielded returns much below the average, and in some cases total failures have been recorded. This is attributable to the exceptionally heavy frosts which were experienced in the latter part of the month of July and the beginning of August. During the period under review severe frosts were recorded locally on fourteen consecutive nights, which had the effect of checking the growth of the crops to such an extent as to destroy the prospect of a good harvest. There was a considerable area under potatoes, and in most cases the yield was fairly satisfactory, but the severe frosts which caused such havoc to the wheat and oat crops were also responsible for materially decreasing the yield of potatoes. A noticeable increase is apparent in the number of fruit trees planted, almost every settler visited having taken steps to at least produce sufficient fruit for his own requirements, and in some cases extensive areas are being placed under fruit trees and vines. Judging from the results obtained it would appear that this district is destined to become a great fruit-producer, as the quantity and quality of the product are, in most instances, eminently satisfactory. With regard to pastoral pursuits there is no material increase in the number of stock, though the horses, sheep, and cattle seen in the country traversed were all in excellent condition. The only losses of stock recorded were a few head of horses and cattle which, having strayed from their owners' paddocks, had eaten York Road poison with fatal results. The number of poultry accounted for this year shows a considerable increase on last year's figures, but, generally speaking, the results of poultry-raising in the district cannot be considered satisfactory. This is probably owing to the severity of the winter months, during which time the production of eggs is practically *nil*. The rainfall, although somewhat below the average for former years in some localities, was sufficient for all requirements, the only exceptions in this respect being a few of the new settlers, who suffered owing to a scarcity of water through not having made any provision for a supply to carry them through the dry summer months. A number of new settlers have made their appearance in the district during the year, the majority of whom appear to be well satisfied with their prospects. The cost of clearing the land proves to be a great drain on the resources of these settlers, and many of them experience considerable difficulty in remaining on their holdings owing to a lack of capital. While on the subject of new settlement I may mention that the last occasion on which I collected the stock and crop statistics for the Collie district, in season 1903-4, there were very few farmers and scarcely any agriculture, and the increase since then in the number of settlers and the area under crop is very marked. I am indebted to the courtesy of the farmers and others from whom I collected returns in affording me every possible facility to gain the required information."

Donnybrook.

Constable Johnston writes:—"I beg to report having completed the statistical returns for the Donnybrook police district. I am pleased to state that this district is greatly improving year by year, this year being more than equal

to other years. During the past year the completion of the Donnybrook to Boyup railway has been a great benefit to the producers in getting their fruit, etc., to market. This railway has also opened up large areas of timber lands, which will necessarily give employment to a considerable and increasing number of men. The timber output has been the largest on record for this district. The feed for stock, generally speaking, has not been up to previous standard, owing to it having been a very dry season. Bush fires consequently also have been numerous. Several settlers have been burnt out, and others had some very narrow escapes. The stock have, notwithstanding, increased and improved, some of the farmers having spent hundreds of pounds in raising the quality of their stock, particularly in regard to horse-breeding, there being some splendid animals now in the district. There have been some very severe losses amongst sheep owing to dogs having worried them. The fly was also very bad in a few cases last year, but the percentage of lambs all round was very fair. The wool clip has been a very good one, and has realised very fair prices. Dairying seems to be increasing year by year, and there are some very successful dairy farmers in the district. The crops have been very good, and some exceptionally good results have been obtained. Oaten hay is mostly grown, it being more suitable for this district than wheat. Potatoes were not as good this year as in previous years, on account of late frosts, there being many failures. The fruit crops are very heavy this year, and nearly every kind of fruit does well, but I have been told by a number of orchardists that the quality this year is not equal to other years on account of the dry season."

Esperance.

Constable C. Lynes writes:—"I beg to report having completed the collection of the crop and stock statistics in the Esperance district. There has been no increase of population during the past year, but recently there have been many inquiries for land suitable for agriculture and sheep raising, and as such land is easily obtainable here there is every prospect of considerable settlement in the near future. The past season has been an exceptionally good one, with feed in abundance, particularly at Balladonia, where the country looked beautiful and the stock were in splendid condition. The settlers declare that the past season has been the best experienced for ten years."

Greenbushes.

The following interesting report comes from Constable F. H. Growden:—"I beg to report that the statistical returns of the Greenbushes district are now completed. During the course of collecting the following localities were visited:—Boyup Brook, Diminupbrook, Upper Blackwood, Greenfield, Lower Blackwood, Balingup, Balingup Brook, Mullalyup, and surrounding country of each locality. As a result of observations made I am in a position to report very favourably on the industrial progress of this portion of the Blackwood district. Large tracts of country have been selected in the vicinity of the Upper Blackwood and the Boyup Brook during the last two years. The new railway line from Donnybrook to Boyup Brook is responsible for the activity in those parts, and already many new homesteads have sprung into existence, while newly-erected fences and newly-rung timber may be everywhere met with. Sheep raising appears to be the prime industry throughout the Blackwood district, and very successful results have been obtained during the past year. The wool clip has been an exceedingly good one, taken on the

whole, and has realised very high prices in the market. Crossbred sheep appear to give the best results, owing to their being more suited to the climate and hilly country. The lambing season has been a very good one, and where special care and attention have been exercised very high percentages of lambs have been obtained. In more than one instance where particular attention has been devoted to the flocks considerably over a hundred per cent. of lambs have been reared. Cold weather, such as severe frosts and continuous rains, in some cases is responsible for smaller percentages of lambs, while the heart-leaf poison and blowfly are in a few isolated cases responsible for a very high death rate among both sheep and lambs. One case is fresh in my mind where sheep turned into a paddock which had been thought safe owing to all the poison being grubbed some months previous, were poisoned in large numbers by consuming the dry leaves and stems of the deadly heart-leaf, which goes to show that it would be wise to completely burn all poison at time of grubbing. Farmers have informed me that the fatal effects of the blowfly, which is a great source of annoyance and alarm to farmers in the South-Western districts, is considerably diminished, if not wholly prevented, by a system of dipping twice yearly. Cattle do not appear to meet with as much favour as sheep in this district, and where there has been an inclination to raise cattle it has been found that they do not thrive on country which has not been ring-barked and divested of zamia palms, the latter being responsible for a high death rate in cattle this year. On farms where large areas of timbered lands have been rung, chopped, cleared, and cultivated, it is found that cattle then do exceptionally well, and dairying herds give very satisfactory results. The system of destroying the palm by the use of kerosene has been adopted in some parts of the district, and found to be effective—a small quantity poured into the heart being sufficient to completely destroy the plant. Horse breeding is also receiving attention throughout the district, and some splendid stud animals have been introduced from time to time. The district, I should say, is all that could be wished for from a horse-breeder's point of view, if the appearance of the specimens met with upon farms and stations may be taken as an example. Poultry, I find, is an item worthy of attention, this district being most especially suited to the same. In my travels through the Lower Blackwood, Upper Blackwood, and Boyup Brook districts, large flocks of poultry were everywhere in evidence. Inquiries elicited the fact that there were few or no diseases amongst them, and little or no trouble was experienced in raising them. In the Boyup Brook district particularly poultry appear to thrive. Turkeys, which are generally supposed to be difficult to rear, are there raised in large numbers without the slightest trouble, and, it is said, require no attention whatever. As an instance of the suitability of the district for poultry raising, a case may be quoted where one farmer cleared a hundred pounds in poultry alone during the twelve months.

As regards agriculture, during the season throughout the district very good results generally have been obtained. Wheat and oats hay is mostly grown, and on an average about a ton to the acre is obtained with the aid of artificial fertilisers. Better results are apparently obtained from oats crops owing to oats being more suited to the wet climate. In some cases on high ground, or ground well drained, very heavy crops of wheat have been obtained. Crop for grain, owing to its success in previous years, is steadily increasing, and in some cases 15 to 20 bushels of wheat per acre have been recorded. Record crops of peas for grain have this year in many cases been obtained.

Lucerne, rape, and other green food have during the past year been cultivated with astonishing success.

The fruit season has been very gratifying to the majority of fruit-growers this year. Apples have been especially prolific, while stone fruits in some cases hardly came up to expectations; yet on the whole the fruit crop has been abundant. In many of the magnificent orchards that I was shown through during my tour of the district the trees were simply loaded with fruit. Nearly every apple tree had to be supported by propsticks being placed under each branch. I noticed in some cases where this had not been done, large limbs unable to bear their load of fruit had parted from the trunk, and fallen to the ground. Almost any variety of fruit, provided it receives a reasonable amount of care and attention, appears to thrive in the Blackwood district. One variety alone I have noticed has failed to produce profitable crops, namely, the apricot. This tree, although being a splendid grower, strange to say, fails to bear, and is generally pronounced a total failure.

Respecting vegetable growing the season has also been a successful one. Heavy crops of potatoes have been grown during the year, and good prices as a rule secured, while kitchen and market gardens have produced an abundant yield of various assortments of vegetables as a result of attention received. Irrigation, *i.e.*, water distributed by gravitation, is finding favour with many farmers. The water from springs appearing upon the hillsides adjacent to the homesteads, which had perhaps for years been allowed to run to waste, is now in many cases, by means of a few hundred feet of piping, the expenditure of a few pounds, and a little time, carried to the kitchen, the stable, the horse trough, and the shower-bath, while of course the orchard, vegetable, and flower gardens receive their share. The system of distributing water by this means—gravitation—has in every case coming under my notice been crowned with success, and the result is certainly very gratifying to the occupants of the particular homesteads, and the system may with confidence be recommended.

In conclusion, I beg to express my great appreciation and, if permitted, to extend my sincere thanks to the settlers of the districts mentioned, for the very kind manner in which they treated me, and their readiness to supply any information in connection with this particular duty. Very little trouble was experienced in most cases in obtaining accurate returns of stock and crops, which I may say was due chiefly to the intelligence of those supplying the information. A readiness to explain any discrepancy that occurred, together with marked civility and cordiality, enabled me to furnish returns of the most detailed nature."

Jarrahdale.

Constable D. M. James states:—"Many of the settlers in the district complain of this being the driest season they have had for years. The birds would appear to have destroyed a considerable portion of the grapes grown in the district, and the settlers say the price they bring in the market does not pay for the trouble of picking and sending them in. The fruit season generally has not been so good as formerly."

Katanning.

Constable O'Connor writes relative to the Katanning district:—"I beg to report having completed the collection of agricultural and pastoral statistics for 1908 and 1909. During the year settlement has made a steady ad-

vance, more particularly eastward towards the rabbit-proof fence, and is likely to continue if hopes are held out of an extension of the railway system in that direction. I regret having to inform you that the grain crop is not as satisfactory as was expected in the early part of the season, owing partly to the very severe frosts, which lasted up till Christmas, and partly to the spring being exceptionally dry. The yield of wheat, oats, and hay on the average is lighter than on previous years, though the acreage under crop was greater than formerly. The fruit crop also suffered from the frost, more particularly grapes and stone fruits, in some instances the latter being an absolute failure. Speaking generally, the district is well adapted to fruit-growing, as both the soil and climate are suitable, and so far it is very free from the pests which are so troublesome elsewhere. Referring to stock, there is a steady increase both in horses and cattle. Sheep have increased considerably, both in numbers and in the production of wool, though several sheepowners complain of having suffered heavy losses through the various poison plants and the ravages of wild dogs and eaglehawks. One settler states that he lost 200 lambs, which were killed by the eaglehawk alone. Otherwise the district is well suited to stock-raising, more particularly sheep. Disease amongst stock is practically unknown, and all are in very good condition. Touching the bacon-curing and dairying industries, there is no appreciable difference. It is almost impossible to get reliable information as to the amount of bacon cured and butter and milk obtained, as only quantities sufficient for household purposes are produced."

Mt. Barker.

Constable McNamara, reporting on the Mt. Barker sub-district, writes:—"I have to report having completed a tour of this sub-district, including Mt. Barker, Frankland, and Gordon Rivers, Cranbrook, Tenterden, and the Salt River. Settlement is steadily advancing throughout the districts named, but more especially westwards from the Great Southern Railway, and also in the Salt River district, where large holdings are the rule. Large quantities of substantial sheep-proof fencing are being erected everywhere throughout the district. It is noticeable that a large number of holders now own small flocks of sheep, upon land which a few years ago only carried a few head of large stock. All stock are in good condition, owing to the pastures keeping fairly green this summer. The mortality among lambs was very great this season, in a few instances reaching to 50 per cent., owing to the heavy frost, which froze the lambs after being dropped, and also to the weak condition of the ewes on account of the backward state of the pastures at lambing time. The crops are about up to the average of previous years. The frosts destroyed a large percentage of the early stone fruit this year, but the apple crop is a heavy one, and the fruit of excellent quality. The area under fruit trees in the Mt. Barker district is extending rapidly, especially the area under apples. The actual yields almost invariably exceed the estimates given to the collector, and no allowance is made for damage to crops by stock, etc., which is frequently the case among the smaller holders. The prospects of the district generally are very good."

Wagin.

Constable H. B. Clements writes:—"I have to report, for the information of the Government Statistician, having completed the collection of stock, crop and industrial returns, in areas embracing Wagin and Dumbleyung,

Dongolocking, Barton, Jalaran, and Merelup, east of the Great Southern railway, and Wedgecarrup, Arthur and Beaufort Rivers, and Darkan areas west of the Great Southern railway. The collection this year was a very heavy one, showing an increase on last year of 175 new settlers, the majority of these being farmers from the Eastern States, English immigrants, and residents from the goldfields, who have in nearly every instance selected east of the line, in the vicinity of the rabbit-proof fence, some having gone as far as 70 miles eastward from Wagin. The crops for Wagin Police District are not nearly up to expectation, the cause of this in almost every instance being the very severe frosts during the winter, followed by a long spell of dry weather late in the season. Another cause of the low average is that this is a particularly large district, embracing lands both on the east and west sides of the railway in the same return. East of the line shows a good average, the west a poor one, the former having some excellent wheat-growing lands, as much as 30 bushels of wheat per acre (and 51 bushels of oats) being grown in one instance. On the western side of the Great Southern railway, that is Arthur and Beaufort Rivers and Darkan areas, the land seems more adapted for wool-raising, and the clip this year was a good one, and also the lambing, although the severe frosts at lambing time were responsible for the greater part of the mortality among the lambs. The trouble from blowfly has been greatly minimised by dipping the sheep. A great deal of clearing is being done this season, and the area under crop during the coming season will be far in excess of any previous year. The fruit season has been a good one except in a few instances, where the frosts blighted the fruit. A large number of young trees also have been planted during the past season. The returns show a substantial increase in stock, and the mortality among horses and cattle is comparatively small. Poultry also shows an increase. A pleasing feature to note is the increase in Wagin of industrial establishments. Whereas three years ago only one return was sent in, this year four have been sent in, which proves that things are getting far more solid in the town itself. My general remarks are first of all that the season has been a fair one. The district is yet in its infancy as far as wheat-raising is concerned. The majority of farmers have only a fifth of their holdings cleared, and of course cannot at present work as much of their land as they would like to. One real good season would, however, put the majority of them in a fair position. Three years ago the farthest settler east to be visited was this side of the rabbit-proof fence 30 miles out; now the settlement has reached 30 miles east of the fence, where a large area has been selected. Clearing is going on, and a number of large dams have been put down. There is not the slightest doubt that both Wagin and its surrounding district have a great agricultural future."

Williams.

Constable A. Wilson writes:—"I have to report having completed the collection of statistical returns for the Williams sub-district for the year 1908-09. It will be noticed that there is a considerable increase in the number of persons making returns since the previous year. I am sorry to report that the crops generally were much below the average yield; only in very rare cases was there found a decent crop, and then it was mostly on small areas. The poor crops were mostly attributable to the very severe frosts during the winter, and afterwards there was very little rain. In some parts of the district there were 18 consecutive frosts, which were so severe that in many places the leaves

of the red gum trees were killed, in fact patches of dead leaves could be noticed all through the forests. I expect a very large increase in the area under crop this year, judging by the areas cleared, I should say that it will amount to thousands of acres. The stock in the district look very well, especially the sheep. Once the poison is cleared, Williams appears to be specially adapted for sheep-raising and wool-growing. I have never seen better fleeces in any of the States than I have seen on the sheep in this district. Speaking generally, I have no hesitation in saying that in the near future Williams will be one of the most solid places in the State."

METROPOLITAN DISTRICTS.

East Perth.

Constable Charles Dodd writes:—"I have to report, for your information, having completed the crop and stock and industrial returns for the East Perth division. So far as the district is concerned there is little or nothing to say. Cattle are about the same as last year. Poultry have greatly decreased owing to the tick pest, which the residents state is increasingly prevalent. I may also state that there is a slight decrease in the population owing to persons removing to other districts, some of them going on to the land."

Wanneroo.

Constable H. Bake states:—"I have to report collecting the agricultural and pastoral statistics in the Wanneroo district. The returns from the agricultural sources are not as good as for previous years. The settlers state the reason for this is partly owing to the late rains and severe frosts, but the biggest drawback they have to contend with is their inability to procure manures, which they have to cart from Perth, a distance of 20 miles. Owing to the bad state of the road between the two centres it is impossible to cart any heavy loads along same, therefore they are not able to go in for market gardening to any great extent. Several new settlers are taking up land in the Pinjar district, and state they are in hopes of soon getting a railway there, when they are sure the district would prosper. Several of the old settlers are starting dairy herds; they say the district is well adapted for butter-making."

Welshpool.

Constable W. T. Lewis states:—"I have to report having collected the statistics in the Cannington, Woodlupine, and Welshpool districts. Wheat, oats, and hay are not grown to any great extent, as only a very few residents have about a few acres of hay each. The district is more of a residential than a farming district. There are a few pig and poultry farmers scattered throughout it, also a few orchards, but the country does not seem specially well adapted for same. I noticed in several orchards trees several years old dying in numbers, probably in some instances owing to want of knowledge in planting, and subsequent care by former occupants. There is little or no progress noticeable in the district since last return."

Victoria Park and Belmont.

Constable A. J. Watts writes:—"I have to report having collected the statistics in the Belmont and Victoria Park districts. They relate chiefly to

racing stables, dairymen, market gardeners, and poultry farmers. No crops of any kind are grown except a few acres of green maize, which is grown by some of the dairymen for their cattle. Three market gardens occupied by Chinese were deserted during last season. There are no large orchards, only a few trees grown for private use. I consider that there is but little difference in this year's returns when compared with last year's records."

Osborne Park, North Beach, and North Leederville.

Constable E. J. Winter reports:—"I have to report having completed the stock and crop returns for Osborne Park, North Beach, and North Leederville. There has been a small decrease in the number of stock, owing, I am informed, to settlers changing their cattle to the Canning, which is customary. There is very little feed, owing to the long spell of dry weather. Most of the cattle in Osborne Park and Leederville are milch cows, which are in good and healthy condition. The principal products grown are vegetables (mixed). There has been a large increase in the total area under market gardens, and the value of production. A few Chinese have had losses owing to flood waters during wet weather. Most of the market gardeners are Chinese, from whom I have had considerable trouble in obtaining the required information, as they do not like leaving their work to do so. Many of them also do not understand the English language. The garden crops are now looking well. There are 10 new settlers (English) who have taken up land at Ngoorgengboro, near Herdsman's Lake, and cleared some ready for next season's crop. The population of Osborne Park has increased during the year. There is no doubt this district is steadily improving. Poultry farming pays well, and there is a slight increase in the number of pigs."

South Perth.

Constable R. Fitzgerald states:—"I respectfully report that I have now finished collecting the agricultural, pastoral, and industrial statistics at South Perth for the present season, 1908-1909. I found all persons from whom I collected statistics ready and willing to supply me with the information I required, so far as they were able. Some persons found it hard to give the value of productions of their poultry and eggs for the year 1908, but they have done it to the best of their knowledge. There is very little difference between the statistical returns at South Perth this season and the returns for last season."

Leederville.

Constable C. Kroschel reports:—"I have to report having collected the returns for the Leederville district south of Redan Street, and found that especially with reference to poultry, they compared favourably with the past year, namely, 1907. There are some first-class poultry yards in the district, and very little disease or tick amongst the fowls. In reference to horses, I have had no complaint of any disease, and there are about the same number in the district as for the year 1907. The crop return is almost *nil*, as it would be confined to about half-a-dozen Chinese market gardens, which only average an acre in extent, and it would be almost impossible to get a correct return from them."

North Perth.

Constable W. Crawford writes:—"I have to report having completed collecting the crop and stock returns within the North Perth municipality.

There are no crops or gardens to speak of in this sub-district, and the stock comprises mostly horses used in town work, and poultry."

Subiaco.

Constable Drysdale reports:—"I find, on comparing the returns with those of last year, the following results:—There has been a slight decrease of land under crop, under fruit, and under hay. As regards stock, horses, sheep, and goats have increased to a small extent, whilst cattle, owing to one big dairy herd having been sold, have consequently decreased, as also has the number of pigs. Poultry, including ducks and turkeys, show a substantial increase. No new industries were started during 1908."

West Perth.

Constable W. Tormey reports as follows:—"I respectfully report that I have completed the collection of industrial, crop, and stock statistics for 1908 for that portion of West Perth which lies north of the railway line, also checked the electoral rolls for portion of the West Perth, North Perth, and Balkatta electorates for the Legislative Assembly, and portions of the Metropolitan and Metropolitan-Suburban Provinces for Legislative Council. There are a good number of market gardeners (mostly Chinese) in this district, with holding ranging from one to six acres each. The returns from this source are much the same as for last year. A great many of them complain that they have suffered considerable loss in their production of fruit and vegetables, and attribute it to the deep sewerage scheme which has been in progress in this district during the year. The return of horses is also much the same as that of last year. Seventeen deaths took place among this stock, which some of the owners attribute to the influenza which was prevalent during the year. The number of fowls is in excess of that of last year, but a great many of the owners complain of having suffered a loss with their poultry owing to the tick pest which is prevalent in some portions of this district. It is hard to get a correct return of the profit or production derived from the poultry, as the majority of the people whom I visited do not trouble about keeping a record of the profit made from them. While engaged collecting the statistics in general I may state that I received the information required with great courtesy and in a cheerful manner from all those people whom I had occasion to visit, and if I be permitted I desire to thank them for it."

Fremantle.

Constable Honner, reporting on the Fremantle sub-district, writes:—"I beg most respectfully to submit for your information that I have completed the industrial, agricultural, and pastoral statistical returns for this sub-district. The principal industries are firstly the lineworks on the Rockingham Road, at Coogee. There are six in all, and a considerable number of men are employed, principally quarrymen and limeburners. Secondly, situated at Robb's Jetty are the principal slaughtering-houses in the State, as are also bone mills, where a large number of men find employment. There are very few cereal crops grown in this district, the white, loose sand round about Jandakot not being suitable for producing cereal crops. Some very fine maize crops, however, have been grown on the rich swamp lands around Bibra Lake; those crops are cut green and chaffed to feed the dairy herds in the district. The rich and fertile swamp lands of Jandakot will produce all kinds of market

garden crops. There have, unfortunately, been several failures of market garden crops during last season, owing to the continuous and heavy frosts experienced during the year, and the rise of water in the swamps this year has been considerably higher than previous seasons. In many instances the rapid rise of water on the swamp lands completely drowned some splendid vegetable and root crops, and the settlers are all advocating drainage for Jandakot. There is no doubt the water difficulty has kept, and will continue to keep, the district in a languishing condition, unless a practical drainage scheme is put into operation. Many of the big gardens in the Jandakot area are held by Chinese, from whom I experienced considerable trouble in obtaining the required information, as many of them do not speak the English language very distinctly. There are some very fine young orchards in the Spearwood district, its rich fertile soil being very suitable for producing all kinds of stone fruits. There is a considerable increase shown in the total production of fruit for this district during 1908. Although the country looks more bare and dry than I have seen it for a number of years the stock look well, with the exception of those in the Beenup and Rockingham districts, where a large number of cattle are suffering from the rickets; the settlers attribute this to the scarcity of feed, hence it is that the cattle take to eating the young *zamia* palms, with the result that they suffer more or less from the rickets. In number there is no noticeable increase or decrease in great cattle or sheep, but in pigs there has been a noticeable increase for the year, and the same can be said about poultry; there are three or four very fine and well-kept poultry farms in the Fremantle sub-district. The rainfall in this district during 1908 was considerably below that registered for 1907."

EASTERN DISTRICTS.

Coolgardie.

Constable F. W. Chandler writes:—"I have to report having collected the stock and crop statistics in Coolgardie, Boorabbin, Woolgangie, Dedari, Bulla Bulling, Calooli, and portions of Bonnie Vale. The stock throughout this district was generally in good condition, not from the amount of grass available, which is naturally scarce, but from the plentiful supply of nutritious shrubs, viz., saltbush, camelbush, and various other kinds, which stock do well on. The rainfall for 1908, 1,070 points, was well up to that of 1907, 1,185 points; but, unfortunately, the fall here is not sufficiently evenly distributed to give the district the full benefit of the amount. In the early part of the season, for instance, there generally is a heavy downpour, then no more for a considerable time, consequently little good is derived from it either for grass or cultivation. Several persons have large dairy herds in this district, which would no doubt do well were the grass sufficient or the shrubs of a better milk-producing quality. As it is, they have to hand-feed their milch cows, which is very expensive, to get anything like a sufficient supply of milk for the numerous consumers. The returns show a gradual increase in cattle, which will necessitate owners taking up more land with a view of fencing for grazing and cultivation purposes. Loss of stock through disease: I think I am right in saying that there has been practically none, with the exception, perhaps, of a few pigs. In this case, fortunately, the health authorities promptly took the matter up in its early stages, and apparently completely

checked the mortality. The crops throughout the district for last year were only very moderate, owing, no doubt, to the unseasonable rains. But for the present year many farmers are launching out on a larger scale, and are putting several hundreds of acres of land under cultivation. If their hopes are realised as regards seasonable rains they should be well repaid for their labours, as it is generally recognised that given the rain when required the soil is good enough for anything. I have to state that there is a considerable decrease in camels owing to the opening of the Norseman railway, the consequent cheapening of freights having caused camel owners to send their teams to either out-back settlements or to the North-West. This makes a considerable difference to the revenue of the district, through the loss of license fees. Goats show a heavy decrease, especially in Coolgardie itself, where many residents keep flocks of them, both for meat and milking purposes, varying from a dozen to 200 head. Owing to the Municipal Council having decided to levy a rate of 3s. 6d. per head in lieu of 6d. as hitherto—a decision which has caused much unfavourable comment—many persons have preferred to dispose of their goats rather than pay the increased tax. In this district and on the fields generally poultry-keeping appears to be a very unprofitable pursuit, as there is so much disease of various kinds to contend with such as roup, consumption of the throat, scaly legs, etc., but, worst of all, the dreaded tick, which, unfortunately, has got a tremendous hold, and which it seems impossible to exterminate. In consequence, many persons who take pleasure in trying to raise fowls are compelled to give it best, on account of this terrible scourge, which kills fine, healthy birds in about three nights by absolutely draining the blood out of them. Fowl food also is very costly here. Turkeys appear to be equally unprofitable, as they require a good deal of attention, are very hard to rear, and expensive to feed."

Menzies.

Constable Quartermaine states as follows:—"I beg to report that I have finished collecting the statistics for the Menzies district. During the time I was collecting I visited Mt. Ida, Woolgar, Comet Vale, Goongarrie, and the 17-Mile, Mulline Road. While riding from one place to another I saw large numbers of cattle grazing, and they were all in splendid condition. I also noticed that almost the whole of the district is very good pastoral country; in fact, I have seldom seen better, although I have lived most of my life in the best pastoral country in the south-west of this State, and I am of the opinion that this country, given a good season, could carry comfortably a considerably larger number of cattle than it carries at present. The pasture consists of wandy grass, blue grass, saltbush, and mulga, and in the spring of the year the bush is covered with wildflowers, which make very fattening feed for stock. The one drawback to pastoralists in this district is the uncertainty of the rainfall; last year we had over 12in. of rain, while the year before we had practically no rain whatever. I attribute the present appearance of the bush to the splendid rains of last year. During the dry spells the cattle are watered from wells, of which there are quite a number in the district, fitted with windmills and troughs. The one disadvantage of this system of watering is that in case of a protracted drought the cattle consume all the pasture within a radius of about four or five miles of the well, and are then kept poor during the rest of the drought by the constant walking from distant pastures to water. However, this will be greatly obviated when more wells are sunk. On comparing my returns with those taken last year, I find a splendid increase in the

number of cattle being depastured in this district. This I attribute to the phenomenally good season we enjoyed last year, together with the fact that pastoralists are just beginning to discover the possibilities of this part of the State."

Davyhurst.

Constable J. Williams writes:—"The rainfall in the Davyhurst district for 1908 was exceptionally good, and produced grass in abundance. Wild turkeys, ducks, and also, unfortunately, rabbits, are numerous. Stock is on the increase through the copious rainfall and abundant grass, and consequently there was no loss of stock through drought. Several fresh applications also have been made for new pastoral leases."

Leonora.

Constable D. Hunter writes:—"I beg to report that during the year 1908 the rainfall for the Leonora police district (statistical area 43) was one of the lowest experienced for many years, and although no great loss of stock was incurred through the drought, the condition of stock in general was very low, and owners had to be constantly watching and shifting them about to prevent loss. Feed for the first six months of the year was very fair, and there were slight rains in April and May, but being so late in the year they did very little good. Water in this district is always plentiful, as breeders of stock have a good supply of wells and windmills, and in most places water is obtained at a depth of 50 or 60 feet or even less. Horse breeding is receiving more attention, and but for the dry season would have shown a substantial increase on previous years. I expect next year, however, to report good results. Cattle breeding is on the same level as other years, and there is no sheep breeding worth speaking of. The return in calf camels was larger than in the previous years. The seasons do not appear to make any difference to this class of stock. Whilst the collection was being taken in January a fall of over five inches of rain was recorded in this district, which did a wonderful amount of good. At the present time grass is plentiful and stock in good condition, and so far the year 1909 promises to be a good one. There is no agriculture in this district, except a little market gardening. Poultry farming is carried on with moderate success."

Mt. Margaret.

Constable E. Allan writes:—"The season for 1908 has been a very poor one indeed in the Mt. Margaret district. The rainfall was very small during the year, consequently feed (particularly grass) was scarce, the stock having to subsist on mulga, saltbush, etc. There has not been any increase of stock during the year. There has been a slight decrease, if anything, a number of the old stock dying off, they not being able to withstand the drought. For the last three years the seasons have been very poor in this district, consequently the stock have not flourished as well as they would have done had the seasons been otherwise. The present year 1909 will be, to all appearances, considerably better than the three preceding years, as there was a splendid rainfall of over four inches in January last; it was the break-up of the drought. There was great mortality amongst the stock when the rain came; about 150 head of cattle and about 200 head of small stock perished for want of feed and the cold. At the present time the country is looking well. There

is plenty of feed about, and the stock are all in good condition. If there is a continuance of good seasons, there will be a large increase of stock in this district."

To the foregoing report Constable M. Tuohy adds:—"Rabbits and wild dogs are becoming numerous in this district, especially the latter."

Murrin Murrin.

Constable Mulkerin writes:—"I respectfully report *re* stock and crop returns that the general condition of this district, from a pastoral point of view, is fair. The rainfall for the year 1908 totalled 614 points, that recorded for the months of January and February being 58 points, and for the corresponding months of this year 379 points. With a fairly well distributed rainfall the district would be exceptionally good for pastoral pursuits. One resident of the district has about 350,000 acres on pastoral lease, all fenced, carrying about 1,400 head of cattle, 100 camels, and 50 horses, which are all in good condition. Several wells have been sunk on the property, fresh water having been struck at depths varying from 60 to 90 feet. Another resident has about 70,000 acres pastoral lease, stocked with about 500 sheep, which are thriving satisfactorily. He states that in his opinion the merino breed is the most suitable for this locality. No stock has been lost through drought, and the losses from other causes have been very slight. As regards pests, dingoes are much scarcer in this district than in those surrounding, which is a decided advantage to stock-owners. I am unable to give the increase of stock, as those mentioned in my report are at the present time being mustered. No cropping whatever has been carried on here."

Dundas.

Constable E. McKinley says:—"I respectfully report with reference to the pastoral and agricultural returns for the year 1908, just completed, that it has been the most prosperous season in the Dundas district for many years, as the rainfall, which at Dundas registered 12 inches 39 points, has been most beneficial both to the small holders and to the pastoralists. The losses of live stock were a very small percentage. As regards the pastoralists one of these states that he has had an exceptionally good year, as during the latter part of the season he was very fortunate with thunderstorms, and has not been short of pasture for his stock. His property is being fenced in with rabbit-proof netting wire, and the contractor is making good progress with the work. Another has also been fortunate, and has had a good quantity of grass for stock, also water, and has consequently been able to supply local butchers with good beef and mutton, which is much appreciated by local consumers. This station has carried a larger number of stock for the year just expired than in former years. The season in the vicinity of Norseman has been good, as during the winter months a considerable quantity of rain fell, but the latter part of the year, unfortunately, proved dry. A most successful grower in the vicinity of Norseman, who goes in most systematically for cultivation, had 95 tons of wheaten hay from 94 acres, whilst, on the other hand, the small crop of another who sowed a little too late was on that account practically a failure, and only realised about 8 tons of wheaten hay from 20 acres. Another, however, had about six acres sown with wheaten hay, which produced about one ton to the acre. Another successful grower produced 146 tons of mixed oats and wheaten hay from 258 acres sown; he also had had a good quantity of

rain and a most prosperous year. The same farmer has about 120 useful fowls. A pastoralist, from 373 sheep shorn has produced 2,270lbs. of wool, and has an increase of 270 lambs from 300 ewes; he also keeps a considerable number of fowls. On this holding 140 tons of wheaten hay were produced from 170 acres sown; loss of live stock in this case, principally sheep, including lambs, numbered about 90. A settler on the Esperance-Norseman Road unfortunately, missing most of the useful rainfall, in consequence found his crop a failure. Other instances, however, prove that the season in the main was a very favourable one; in fact, better than for a number of past years. Most of the people in the Dundas district say that the year 1908 has been more prosperous from a farming point of view than any year previously experienced."

Yarloop.

Constable Nisbet writes:—"I respectfully report having collected the agricultural and pastoral statistics in the Yarloop sub-district for the 1908-9 season. During the period the rainfall was several inches lighter than the average. This, however, apparently did not affect the grass, which was plentiful during the season, stock in different parts of the district being all in good condition, whilst the crops also were well up to the average. There has been no noticeable increase in stock during the season, nor has there been any quantity lost through disease, etc., though a few have been killed by dogs or by accidents. During the past few seasons the settlers have given more attention to growing wool than was previously the case, as almost every farmer with 150 acres of land and upwards has now a few sheep. The clips have been good, and satisfactory prices obtained. The principal crops grown are oats, hay, potatoes, and fruit, good crops of both hay and potatoes being attained in almost every instance. Some exceptionally fine samples of oranges and stone fruit were gathered during the season. Grapes are not grown extensively, a number of settlers having grubbed up most of their vines, the reason being the low price obtained and the destruction of the fruit by birds, causing the profits to be very small. In the vicinity of Harvey the principal product is oranges. An extensive drainage scheme was completed there during the past year, and the trees are already showing an improvement, the new growth of wood at some of the orchards being very marked. A large number of young trees have been planted around Harvey during the year, and land is now in course of clearing for further planting. There has also been a considerable area cleared and ringbarked in other portions of the district. Poultry do well throughout the district, and if good breeds are kept pay accordingly. Dairying also receives a good share of attention. A large amount of butter is made on the farms, whilst in other cases settlers close to railway stations send their cream to the factories. The returns received from either method are good. The settlers throughout the district I found anxious to give the particulars as nearly correct as possible; but in some items, such as the value of eggs and poultry, quantity of milk obtained, and quantity made into butter, they found it impossible to give anything more than an estimate."

Malcolm.

Constable Sartori writes:—"I respectfully report, for the information of the Government Statistician, having collected stock and crop statistics for the year 1908 at the various places in the Malcolm sub-district, namely:—Pig

Well, Mertondale, Waitakauri, East Lynne, Black Chief, Webster's, Bummer's Creek, and Desdemona, and may state that the country through which I had occasion to travel whilst collecting the above returns is looking very well indeed. There is an abundant supply of fresh water and good grass, owing to the splendid rainfall here in January of this year, the rainfall of that month being 5in. The stock at present are in splendid condition, but there has been no increase or decrease of any note. At Bummer's Creek, 12 miles from Malcolm, several Afghans are working 10 acres of land taken up as a garden area; some of the finest fruit and vegetables in the State are grown there, more especially grapes and figs, clearly demonstrating what can be produced on the northern fields with a plentiful supply of water and good manuring."

Laverton.

Constable Kennedy writes:—"I respectfully report for the information of the Government Statistician, that I completed collecting the stock returns for the Laverton district, which extends to the Erlstone, Salt Soak, and Hootanney cattle stations. The country is looking well at the present time, with plenty of grass everywhere, and the stock consequently also look well. There has been a slight increase of stock since last return was supplied. The rainfall is very small in the district, an average of 5 or 6 inches, although the present season seems to be an exception. Good rains fell in December, and again in January, which falls are responsible for the country looking so well. There has been no loss of stock to speak of."

Burtville and Mt. Weld.

Constable O'Loughlin writes:—"I respectfully report, for the information of the Government Statistician, that I have collected the crop and stock statistics in the Burtville and Mt. Weld districts. The country which I passed through to obtain the returns was dry and desert looking. Only in places there was a fair amount of grass. The rainfall is not very good in this locality, and consequently stock grazing is not increasing, and no crops exist. The country is covered with mulga and other shrubs. Surface water is very scarce, but fair supplies of water have been obtained in places at a fairly shallow depth. Mining is the industry carried on in these places."

Kookynie.

Constable Dodd writes:—"I respectfully report, for the information of the Government Statistician *re* the condition of the country in the Kookynie police patrol district. The country was very dry for a long time before, and at the time the returns were collected this year so dry that nearly all the rabbits died of thirst and hunger. There is no grass, but there is plenty of good mulga, which is good feed for cattle and bush-bred horses. Cattle appear to do well, and increase rapidly. The pastoral leaseholders have wells at places where there is plenty of mulga, and windmills and tanks at most of the wells. There are very few sheep in the Kookynie district, as there is no grass, and the dingoes are very numerous; sometimes the latter do a great amount of damage by killing very young foals, calves, etc., and packs of them watch cows when calving, and kill the calves. Good water can be found in almost any part of this district at a depth of about 90ft., but the deeper the well is sunk after striking water the more brackish it gets. There are good Government wells on the main roads in this district."

Pinjarra.

Constable H. W. Mann writes, relative to the Pinjarra district:—"I beg to report that the past season has been a fairly good one, notwithstanding that the rainfall for the year was below the average, and the frosts were unduly severe, yet the feed has been good, and stock generally are in good condition. There has been only a small increase in stock during the past year. Of course this is accounted for by the fact that no one in the district goes in for breeding extensively, since the majority of farmers occupy small holdings only, and are not in a position to do so. This district is best adapted for fruit-growing, and quite a number of the settlers are turning a portion of their holdings into orchards. As it is, fruit-growing has been long-established here, and during the past season there has been abundance of fruit throughout the district. Some of the oatens hay crops have been very good, the yield being on an average of over two tons to the acre. Ensilage is made by two farmers, and they have been well rewarded. A good deal of ring-barking and clearing has been done during the year; in parts of the district the land is much better than other parts. In the lower portion of statistical area No. 383 there are several market gardens, and abundance of vegetables have been taken off them during the year and sold. In another portion of this area the Government has put in large drains through the settlers' holdings to carry away the flood water in the winter, and the settlers hope to irrigate from these drains in the dry summer months and grow grasses all the year round. The new Marrinup railway line is now being constructed; when finished it will be a great benefit to the settlers, providing an easy means of sending their produce to market. This portion of the district is well adapted for fruit-growing, also it is good sheep country; when the timber is rung the grass grows in abundance. The wool clip has been very good all over the district."

Burbanks and Widgeemooltha.

Constable W. Brodie writes:—"I respectfully report that I collected the agricultural statistical returns in the Burbanks, Widgeemooltha, and Higginsville districts, and when making said collection I travelled through several miles of good canegrass and saltbush country, which is very suitable for grazing stock. Although the country is very poorly watered, all the stock I saw *en route* were in splendid condition. There is only one farm in the district, 30 acres of which were cropped, and which, owing to the splendid rainfall during the season, gave a return of 11½ tons of wheaten hay to the acre."

MIDLAND.

Gingin.

Constable S. Pimblett, reporting on the Gingin sub-district, writes:—"I have to report having completed the crop and stock statistics in this sub-district, which includes Gingin, Gingin Brook, Yanchep Caves, Moore River, Wannamal, Bindoon, Chittering, Lower Chittering, and Muchea. From observations and information supplied by settlers the present season would appear to have been not so good as the previous one. The cereal and hay crops show a slight decrease on last season's figures. This is attributable to the heavy frosts experienced in the latter part of July and early in August; in fact, the frost was so severe as to injure red-gum saplings. They also interfered

with the yield of potatoes, in some cases the crop being an entire failure, and in most others only half the average yield. The orange crop this season was not so prolific, but the quality was of first-class order. Stone fruit was practically a failure, the cause of which is not known. There is no material increase of stock, the settlers having had no grass to spare, owing to frosts. The condition of the stock, taken right throughout the district, is fairly satisfactory, and the yield of wool up to the average. Wild dogs have played great havoc with sheep in the Wannamal district. In a radius of five miles as many as 450 deaths of sheep can be traced to their depredations. A reward of £10 was offered by stock owners who so suffered for one particular dog, and I am pleased to report that it was captured by a cunningly-laid trap by one of the parties offering the reward. Bush fires have been very much in evidence this season, but only in places where they have done a vast amount of good, the benefit of which will be reaped in the coming season. There are a few more settlers in the district than there were last season, and I anticipate that in the near future a lot more will come along, as the Midland Railway Company is throwing open about 60,000 acres at an early date. I am indebted to the courtesy of the settlers for obtaining all information required, but at the same time have to point out that in few, if any, instances are regular stock accounts, etc., kept.

VICTORIA DISTRICTS.

Mullewa and Mt. Erin.

Constable P. Walsh states:—"Sheep farming is the principal industry in this district. The lambing was good, also the wool clip; horses are not given much attention, except by one or two station owners. The dairy herd is very much neglected; only a small number of cows are kept, and they are only milked while the grass is good, which is for a period of about three to four months. Pigs do well, but they are looked upon as being too destructive by most of the farmers. *Re* crops, the season has only been fair, chiefly due to the fact that a large percentage of the rain fell in July, 1908, before most of the sowing was completed, and was followed by a long spell of dry weather intermixed with frosts. The new settlers are doing their utmost to have a fair amount of crop put in for next season, but in the Mt. Erin and Mullewa districts they have been handicapped through not being able to obtain good water, although a lot of time has been spent in boring and well-sinking, etc. Most of them now have decided to make dams in the hope of thus overcoming the difficulty."

Dongarra.

Constable W. J. Adams reports on the Dongarra district as follows:—"I have to report for your information that I returned to station on 16th instant, having finished collecting statistical returns. I visited all settlers around Irwin, and thence on to Hill River. Although the country looks more bare and dry than I have seen it for a number of years, the stock look well, with the exception that south of Dongarra a lot of them are very rickety. In number there is a considerable increase over last year, but settlers complain of being unable to dispose of them on account of the very low prices offered. The crops have not been so good, owing to the scarcity of rain, the number of points registered at Dongarra being 2,116 for 1907, and only 1,718 for 1908.

No record appears to be kept at any other places visited. There is a very considerable increase in the amount of land alienated both from the Crown and the Midland Railway Company. Settlers complain of the number of wild dogs in the district, one man informing me that they sometimes eat his calves, which he attributed to the scarcity of kangaroos."

Greenough.

Constable L. H. Thompson reports:—"I respectfully report having collected the stock and crop returns in the Greenough district. The crops throughout the district this year are very much below the average of other years. I am informed by the farmers that this is due to not having late rains, and severe frosts coming in August and September; the frost burnt all the wheat crops more or less, especially those on heavy land. Some of the crops on heavy land were a total failure; the best crops were got off fallow land sown with wheat called King's Early. The stock throughout this district are very poor, especially the sheep. Farmers and squatters expect to lose a great number of young sheep before the green grass comes in. Feed in the paddocks is very scarce, which the squatters say is also on account of the heavy frosts during last season. I also think the big stock will suffer very much before the green grass comes in."

Northampton.

Constable W. T. Pollett, reporting on the northern portion of the Northampton police district, which includes all settlement on the north side of Norman's Well and the Bowes River from Brookfield to the sea coast south of Willow Gully Station, writes:—"The yields in the grain and hay crops have not been as satisfactory as for the previous season, and the increase in stock has not come up to expectations. The root crops were disappointing, and there has not been anything like the same growth of grass in the district as in 1907. This unsatisfactory condition of things can be accounted for by a shortage in the rainfall, and the continuous heavy frosts experienced during the winter; also, there was a plague of green grubs, which attacked all root crops, grass, and fruit trees, causing the gardeners a great deal of trouble and expense, as a constant spraying with Paris green solution was the only thing that checked them. All things considered, in my opinion, the late season would appear to have been the worst experienced here for many years."

Mingenew.

The following is Constable G. O'Hern's report on the Minginew district:—"I beg to report having completed collecting stock and crop returns in the Minginew district. Throughout the above area, which embraces portions of the Irwin, Strawberry, Nangetty, Narrakine, Codgy Codgy, Bowgarder, and along the Midland railway to Marchagee, Jun Jun, Meelyah, and a portion of the Arrowsmith River, the country is very dry. The crops have been patchy; what was put in early did very well, but late crops suffered from the severe frosts and dry weather during the latter part of the winter, there having been an average throughout the above area of about 7in. of rain less than usual. Since the beginning of November last heavy thunderstorms have been disastrous to the dry feed in many places, and stock are now feeling the bad effects. Agriculture is much on the increase, in comparison with last year's returns, and I notice the district generally much improved. At Marchagee

considerable progress is being made, whilst Three Springs is going steadily but surely ahead, and in spite of the bad season the farmers' exertions have been rewarded by very fair crops. I may say in concluding that the district on the whole is improving fast."

MURCHISON DISTRICTS.

Day Dawn.

Constable A. J. Martin reports:—"I notice an increase of sheep and cattle held by the principal pastoralists. The season has been very good; plenty of food and water generally. The loss of live stock has been very small. There is no farming done in this district, only a little gardening, kitchen and market." He calls attention to the increase in the number of goats, the introduction of Angoras, and the establishment of a goat dairy; also to the larger number of poultry-keepers than last season, whose yards had, however, unfortunately been thinned by disease during the summer.

Cue.

Constable Grace reports as follows on the Cue sub-police district:—"I have to report having completed my crop and stock returns for the following districts of Cue sub-police district, viz., Mindoolah, Cuddingwarra, Nallan, Tuckanarra, and Webb's Patch. In none of these districts are there any crops. With regard to stock, taking the district as a whole, the number of stock appears to be about the same as before, there being neither an increase or decrease to a noticeable extent. Owing to the depression in the mining industry at Mindoolah and Cuddingwarra, a number of miners have left these places, but as a rule these men owned little or no stock, and their departure has not materially interfered with the quantity of stock at these two places. Right through all the district visited the stock of all kind appeared to be healthy and in good condition. In a great measure their condition was probably due to the fact that owing to the late rains feed is everywhere extremely plentiful."

Barrambie.

Constable Grose reports that, owing to a seasonable rainfall of about 9in., the country is in a fair condition, and that consequently the few stock there are also in correspondingly fair condition.

Meekatharra.

Constable Sampson reports on the Meekatharra portion of the Murchison district as follows:—"This district has turned out very prosperous generally, there having been a considerable amount of stock imported into it from other districts in consequence of the number of new finds of gold and the favourable development of those already in existence. So far as stock breeding is concerned, there are no large holders, most of the stock being owned by prospectors. Several persons have taken up country for the purpose of running a few head of dairy cows, but with no specific intention of actual stock-raising. There is, however, one exception to this, a stock-owner who is making the attempt, but at present only on a very limited scale. Speaking generally, there has been a moderate increase in such stock as there is, the season on the whole having been good, and feed, owing to a good rainfall, plentiful. The

present year should prove to be an exceptionally good one on account of the recent splendid summer rains. Referring to the raising of poultry, a specially important industry in a mining district, there is a general complaint throughout the district that fowls cannot be raised in large numbers on account of an epidemic prevalent among them, known locally as 'plague.' This disease is at present very hard to combat, owners being as yet totally unable to successfully diagnose and treat it."

Peak Hill.

The following is Constable Cusack's report:—"I visited the following stations: Bryah, Cobran, Mebbian, Wolyngunna, Barrambar, Buller Downs, Windell, Manyangbunna, Wigan, and Horseshoe. The country was very dry until I arrived at the south branch of the Ashburton River. There I could see that heavy rains had fallen, as all the creeks and rivers were running from there to Peak Hill. There had been no rain on the main branch of the Ashburton River, or north of it so far as I went. All the station owners stated that they had had a very bad season in the early part of 1908, but had good winter rains, which gave them plenty of feed and water until the end of 1908. There was a fair increase of stock throughout the district during 1908. During the dry weather most of the stock in the district has to be watered at wells, and they ate all the feed around the wells for about four or five miles. In many places where there is country with good feed the owners cannot obtain water, and the country is useless to them except after rain. All stock that I saw on my journey around the district looked fairly well and in good condition. All Government wells on stock routes were in good order. There appears to be no poultry produced for sale in this sub-district, and no records are kept either of the number of eggs produced or fowls killed."

Nannine.

Constable Fitzsimons, reporting on the Nannine sub-district, says:—"I have to report, for your information, that, while collecting statistical returns, I visited Stake Well, Burnakurra, Quinn's, Gabanintha, and Star of the East. The whole of the district I passed through, owing to the recent rains, looked splendid. A good year for this district is now assured, there being abundance of water, while the grass is springing up well everywhere. The stock are all in good condition. Landholders in this district are beginning, it would appear, to favour sheep-breeding in preference to cattle."

Mount Gould.

Constable Page, reporting on the Mount Gould district, states:—"I have to report that I returned to station January 27, 1909, having patrolled the Mount Gould district for the purpose of collecting statistics. From what I could see and learn, the country round Belele Station has had a good year. The stock seemed to be in good condition, and there was plenty of good feed. Two inches of rain fell on Belele early in January, 1909. Other stations visited were Moorarie, Beringarra, Milly Milly, Byro, Mt. Narryer, Manfred, and Mileura. The owners or managers of the stations mentioned seem to be satisfied with the season, and a reference to the previous statistical figures will show a very satisfactory improvement. I may say that there is a general improvement in the stock carried on the stations throughout the Murchison pastoral areas. The rain that fell early in January was fairly general, and good green grass could be seen everywhere after it,

The numbers of points registered on the various stations were as follow:—Belele Station, 200 points; Moorarie Station, 166 points; Beringarra, 304 points; Milly Milly, 200 points; Byro, 200 points; Mt. Narryer, 161 points; Manfred, 219 points; Mileura, 750 points. After leaving Manfred Station for Mileura Station, there was a very heavy rainfall. The early rain in Mileura registered $3\frac{1}{2}$ in., and the second rain 4 in. I have been informed that the latter rain was general. Mr. Walsh states that it was the highest flood he has ever seen on Mileura Station. The water was all round the house, and had to be banked out with earth. One could see nothing but water for miles on every side. A large extent of new country has been taken up around Milly Milly, and the owners are doing a lot of well-sinking, also erecting windmills and fencing. The country generally is now looking well, and owners are pleased with the prospects for the ensuing season."

Yalgoo.

Constable W. Baumgarten states:—"The past season in this district has been a very good one from a pastoral point of view, as the rainfall for the year was 10 in., this amount being in excess of the average. All stock that I saw were in good condition, and feed was plentiful away from the wells. There is a substantial increase in the number of stock over the previous year's returns, and also in the wool clip for the season. Cropping is not gone in for extensively, there being only two small holdings under crop, and the results were in both cases unsatisfactory."

Mt. Magnet.

Constable Jas. Stephens reports:—"These last two seasons in this district have been remarkably good, $5\frac{1}{2}$ in. of rain having fallen during January, 1909, and heavy summer rains having been experienced both years; there is splendid feed, plenty of grass and saltbush. There has been a large increase in the number of sheep and cattle in the district, and a very high percentage in lambing, and all the stock is in very good condition."

Wiluna.

Constable W. Walker writes:—"A great many changes have taken place in the Wiluna district during the past year, due to the improved condition of the mining industry, and at present it appears likely that this improved condition of things generally will be maintained. There has been a considerable increase in the population of this sub-district since last year, and the total population is now approximately 694, compared with 534 in March, 1908. The season just past has been an exceptionally good one, due to the splendid rainfall (the best for eight years past); the country generally around Wiluna looks beautiful at present, and all stock depastured in the vicinity show a marked improvement in appearance; natural feed is very plentiful, and now that the winter is coming on, there is every indication of a long period of prosperity for settlers, particularly those engaged in the pastoral industry."

NORTH-WEST.

Roebourne.

Sergeant Pilmer writes:—"Under separate cover I have the honour to forward stock returns for Roebourne, Cossack, Tableland, and Whim Creek sub-districts. During the year (1908) only a very moderate season was ex-

perienced, and in some places the absence of rain was sorely felt, resulting in losses during lambing. However, during this year splendid results, so far as increases are concerned, are assured, as bountiful rains have fallen almost throughout the whole of the Roebourne police district, and with a few inches of rain during the months of May or June which may be confidently anticipated, a record season is almost a certainty. Feed and water are now abundant, and stock are fat."

FIBRE CONGRESS AT SOURABAYA IN 1910.

With a view to promoting the cultivation of fibre-producing plants, the Netherlands East Indian Agricultural Syndicate has decided to hold, at Sourabaya, Java, in October, 1910, a Congress, combined with an exhibition of fibre producing plants, of the fibres produced therefrom and of the machinery used in the preparation of same. During the Congress, the cultivation and preparation of the raw fibre, both mechanically and manually, will be discussed. The extraction, preparation for market, and packing of the fibre will, as far as possible, be demonstrated.

Various prizes (medals, diplomas, and money-prizes) will be offered for machinery. Such prizes will be awarded to the exhibitors of machines, which shall work for a sufficient time during the Congress and be considered worthy of an award by a committee of impartial experts.

A prominent place in the programme will be given to the consideration of the cultivation and preparation of those fibres most suitable for culture on a large scale in the tropics.

Special attention will be given to the following, viz.:—

- (1.) Agave Fibre, the cultivation of which is spreading so largely and which is specially adapted for dry tropical countries.
- (2.) Manilla Hemp, also a fibrous plant fit for cultivation on a large scale and which produces a profitable crop in the moister districts of tropical countries.
- (3.) Jute and Jute Substitutes. Of importance in all tropical countries, seeing that a large part of the packing material necessary for other produce is made therefrom.

As the cultivation of fibres 1 and 2 and the like can only be remunerative when carried on with efficient machinery for the treatment of fibre on a large scale and when suitable hand machines be available for the use of the small producer, special attention will be paid to the testing of machines sent in for exhibition, both as regards the extraction and treatment of the fibre. In addition to the above-named, other fibres may be dealt with more or less fully according to the interest shown at the Congress.

A detailed programme will shortly be published dealing with the project in all its particulars and enumerating the prizes to be awarded. This preliminary notice will serve to make known to all those who are interested in the cultivation of fibres in tropical countries, the opportunity shortly to be offered of exchanging ideas on the subject, and will give timely notice to manufacturers of machinery of the opportunity to be given for displaying the merits of their respective specialities.

WESTERN AUSTRALIA'S WHEAT EXPORT.

An official estimate early in December last, based on the hopeful reports then to hand from the different agricultural districts placed the possible output of grain for this year at approximately, 13,000 tons. Already almost seven-eighths of this tonnage are now afloat for the United Kingdom, and when the vessels at present under charter have shipped their cargoes and cleared Fremantle, 16,316 tons, roughly, will represent the extent of this season's grain export trade. The season was inaugurated by a shipment of 2,333 tons by the sailing ship "Blythwood." This consignment was followed by the turret steamer "Clan Gordon," with 4,980 tons, and the barque "Inverrurie," with 2,283 tons, representing a total of 9,596 tons—valued roughly at £73,942—shipped to the United Kingdom from Fremantle alone, up to and inclusive of March 31. During the same period 102 tons of wheat, valued at £674, were shipped to Burmah from Geraldton, while from Albany Messrs. John Darling & Sons—the chief wheat buyers of the State—despatched to the United Kingdom a further consignment of 1,418 tons, valued at £10,590.

The Norwegian barque "Bris," of Grimstad, loaded a shipment of 1,600 tons under the agency of Messrs. Ockerby, Lehmann, & Co., Limited, for Delagoa Bay. During the month the barquentine "Westfield," with 1,600 tons, shipped by the Producers' Union, and the s.s. "Australind," with 2,000 tons for the United Kingdom by Messrs. Dalgety & Co., this shipment constituting probably the final one of any importance for 1909. The following figures set out clearly the growth of the wheat export industry since its inauguration in 1904:—1904, 261 tons; 1905, 1,273 tons; 1906, nil; 1907, 9,921 tons; 1908, 3,463 tons; 1909 (approximately), 16,316 tons.

PIG-BREEDING.

TREATMENT OF SUCKLING SOW.

When the sow has farrowed a few days or a week, and is found to be going on all right, her bed should be cleaned out well. It is a good plan (says Garratt in *Practical Pig-keeping*) to throw down a little lime, but so that the pigs do not get it in the feet. They should then be kept well littered up with good wheat straw if possible. The bedding and everything should be removed every few days or once a week at the longest, and fresh given. It pays well to do this, as it keeps the pigs better on the skin and in healthier condition than if allowed to lie on a stale bed. On a farm there is no difficulty in keeping them in good abundant bedding. Wet or damp straw

must on no account be given, and as much care should be taken in this respect as one would take in seeing that he himself slept in a warm and dry bed. Husk, cold, or cramp is sure to follow the use of damp bedding.

The best and cheapest food for a sow with pigs is good fine toppings or middlings with an admixture of bran, and there is nothing safer. The toppings of themselves are apt to be too sticky, and a little bran added will keep the bowels in order, and will be a better food. One part of bran to two or three parts of toppings, more or less according to the number of pigs the sow has and how she is suckling down, should be given. If it is a large sow with only five or six pigs, then she must have more bran and less toppings, unless she is getting old or is not a good breeder; then, if the season is right, it may be advisable to feed her well, so that by the time the pigs are ready to wean she will be nearly ready for killing. In the case of a free milking sow with a good litter, she cannot be kept too well; but it must be borne in mind that always having a trough full of food is not feeding well, but is only a slovenly way of feeding, while nothing is worse for a good sow. It will cause her to get dainty and off of her stomach quicker than anything. A sow should be given only as much as she will clear up at each meal. Feed her twice each day, as early in the morning as possible and as late at night as convenient—not sometimes at 6 a.m. and sometimes at 8 a.m., sometimes at 3 p.m. and sometimes at 6 p.m. Regularity should be practised. The sow will know when the time comes, and if delayed long she will be on the fidget, and do herself a deal of harm. In the middle of the day she should be given another feed if she has a good litter, and is suckling down. Many feeders like to give the ordinary feed at this time, but I prefer to give a little green food—mangolds if they are ripe and good—a few carrots, vetches or clover, according to the time of the year, as some green food will keep her in health and appetite. If she is getting down very weak and low, a few dry *old* beans will do her a lot of good and keep her up. She may then be with the pigs till the afternoon's feed, or let out for another hour or so; then the afternoon feed and be left for the night. In giving the afternoon feed, enough should be given, and if a little is not quite cleared up, no harm will be done as it is longer till the morning; but a large quantity must not be left. For the first meal in the day it is well to give only just sufficient so that she could eat a little more. It cannot always be given to a nicety, but a clean trough should always be kept through the day.

RETURN OF MR. G. COMPERE.

Mr. George Compere, Entomologist for the States of California and Western Australia, conjointly, returned to Perth from the Far East on the 8th instant, after a prolonged tour. He has prosecuted his search for parasites of insect pests through various parts of the world, and has brought with him a large collection of plant and scale specimens for development in the Departments' laboratory.

In giving a brief history of his travels, Mr. Compere says:—

"During the trip the greater portion of my time was devoted to work for California, and I forwarded more specimens to the Government there than I sent here. In the two previous years California received little or nothing from my work, for my time was so much taken up in connection with the introduction of the fruit-fly parasite into Western Australia. I think I may say that I have accomplished more this year than in any three former seasons, and I have prepared the way for a lot of developmental work. At Hong Kong I left a large number of plants under cover, on which I am propagating various scales to expose them to the parasites, and these will be transhipped to California and Western Australia. I shall return to China in a month or six weeks to work on these specimens, and I also want to continue my investigations of the potato moth in that country.

The Potato Moth.

I went to Europe first to make searches in Germany for the Government of this State. I found that although the moth existed there, it was impossible for the pest, owing to the clean methods of cultivation, to do any damage worth mentioning. For instance, the people do not allow any old potato vines or small potatoes to remain on the ground. All are immediately destroyed. While there are hundreds of acres under potatoes one cannot find a vestige of *débris* on the ground. It is all destroyed in some way so that the moth has no chance of finding anything to carry it over the hibernating stages between the seasons. In Belgium I did the same kind of work with much the same results. In China they go in a lot for potatoes. On two occasions in Hong Kong I found the moth in locally-grown tubers, but it was impossible to locate the field where they were grown. China is a place of such vast territory that it might take years to locate a particular place, but it is certain either that the potato moth has an effectual natural enemy in China, or that the moth itself has only been recently introduced. I have searched for it there on previous occasions without finding any traces of it.

Red Scale.

I have brought back at least six species of parasites of red scale alone. We are making a little propagating house, and I have no doubt that they will all develop properly. So far as red scale, black scale, and in fact all of the *lecanium* species of pests are concerned, I think we now have enough parasites in this State to place them for ever on the list of the "has beens." From the Orient I forwarded to California a great number of parasites for the purple scale, which has not made its appearance in this State. They also wanted more

parasites of the red scale and various forms of the lecanium parasites which I have brought back with me here.

Woolly Aphis.

I devoted a great deal of time in searching for an enemy of this much-dreaded apple pest, but did not discover anything of importance. I think we will have to carry the search for this parasite into countries that have yet been unvisited, such as Russia, Siberia, and Persia.

The Cabbage Moth.

The parasite that was introduced from India last year has become established, and will, I am sure, make itself felt in the course of a year or so. This, in conjunction with the previously introduced parasites, will make it every year easier to commercially grow cabbages. Some time ago the Royal Commission appointed to inquire into the high cost of living in this State had the question of vegetables brought under their notice. It was shown that cabbages were bringing from 1s. 6d. to 2s. each, and the reason given was that owing to the ravages of the cabbage moth it was found impossible to grow them locally. Mr. J. M. Hopkins, who was chairman of that Commission, and who afterwards became Minister for Agriculture, desired me to look out for parasites and natural enemies of both cabbage moth and cabbage aphis. Since then I have introduced enough, I believe, to make it possible to grow cabbages without much loss, and without the use of artificial methods. The cabbage aphis is now practically controlled by the three species of cabbage parasite already introduced. The last one was brought from Colombo last year and taken a strong hold, and is proving most effective. A vast amount of correspondence received by the Department can be shown in proof of the work of these insects.

Scientific Advancement.

While in the Philippine Islands I was greatly struck with the extensive nature of the work being done in a large bureau of science. They have a great number of students taking courses in all branches of science. They are devoting a good deal of attention to the cultivation of pasture grasses, and I formed the opinion that a similar institution would be of great value here. I think the Government would do well if they commissioned an officer, such as Mr. Despeissis, to visit this establishment and furnish a report. He might also extend his inquiries to California, where he could take notes respecting fruit and the fruit-packing methods adopted there. Western Australia will soon be a large exporter of fruit, and they must follow the very latest and best methods. Useful information might also be obtained regarding fig culture in California, and many other things there which would be of great service to this State, and which, in my capacity of a searcher for beneficial insects, I have not time to inquire into. The knowledge thus gained would be worth a thousand times the expense that would be incurred.

The Work of Parasites.

Mr. W. Froggatt, Government Entomologist in New South Wales, was commissioned by the Eastern States to investigate and report on parasite work in California and Hawaii. He has condemned the whole thing, I believe, and claims that the parasites are of no commercial value. The reports furnished

by him to his Government are without any foundation. I understand that he spent the whole of his time, not with those people who were versed in the proposition for the introduction of the parasites, but with parties who, like himself, were opposed to the work from its very infancy. The Hawaiian people have been very much provoked by the reports which Mr. Froggatt sent out respecting parasite work in their island. I intend to answer Mr. Froggatt fully as soon as I get hold of his official report. So far as California is concerned there could be no better argument in favour of the work than the fact that one of the first acts of the new Commissioner was to build an insectary at a cost of £2,000, for the purpose of propagating beneficial insects. This does not look as if parasites have no commercial value. To show the effect of the parasite in this State I need only say that when I first came here all the trees about Perth were covered with black smut and the exudation of the scale, but now it is almost impossible to find any black scale to breed the new parasites upon. I would like to add that I have been very pleased with the results of the fruit-fly parasites, and with the able manner in which Mr. Newman (Assistant Entomologist) has carried them through the dormant season. It is only a matter of time for these insects to give a proper account of themselves.

GRAM.

(*Cicer arietinum*.)

The illustration opposite represents a specimen of the Gram (*cicer arietinum*), a leguminous plant, which was grown in yellow sand, with the aid of a periodical watering by means of a sprinkler during the summer months. As will be observed, the growth of the plant has been good and the yield of seed-pods prolific.

It is considered that Gram will thrive to better advantage in the drier districts on sand or loamy soil, with occasional waterings, than in humid localities. The peas are utilised for stock feed, and in some parts for the adulteration of coffee.

In planting 30lbs. to 50lbs. of seed should be used to the acre, which should result in a crop of from 10 to 30 bushels, with an average of 15 bushels to the acre.

The Gram is a native of Northern India, and a heavy grower. The pods are small and stumpy, with one and sometimes two seeds, which are well developed, and have the same flavour and sweetness of the ordinary vegetable garden pea.

It was intended to show the nodules on the roots of this variety of legume, but the specimens that have been grown in this State and brought under the notice of the Department of Agriculture have not exhibited these root peculiarities in any prominent degree.



Gram: A fodder plant.



TRAPPING FRUIT-FLIES.

(By T. Hooper, Chief Inspector of Orchards.)

I wish again to draw the attention of the fruit-growers of this State to the use of kerosene as a trap for fruit-flies. I find on visiting the orchards in the fruit-fly zone, and from the reports from the inspectors, that not ten per cent. of the growers put kerosene in their trees prior to the advent of the fly; and even when the fly has made its appearance, it is surprising how careless many growers are in allowing maggoty fruit to hang on the trees and lie on the ground, even then not twenty per cent. using kerosene. They wait until the inspector comes along and compels them to clean their orchards and hang tins of kerosene in their trees. The trifling cost of kerosene and the little amount of extra labour are covered over and over again by the value of the fruit saved.

Prevention is always better than cure, therefore a few tins of kerosene should be placed early in the summer in such trees as are carrying ripening fruit. If the first pairs of flies are caught, imagine the saving right through the season. Many growers use too deep tins. I find that by far the best results are obtained by the use of bright shallow tins, such as lids of cocoa tins; and these should be tacked to a slender pole, which should be sharpened so as to be stuck in the ground with the top leaned into a fork in the tree, and that there would be no danger of the kerosene upsetting and killing any of the limbs. Deep tins should not be used, as the flies do not care to go into them.

This year we are very free of the fruit-fly compared with previous years; this I put down principally to the compulsory use of kerosene last autumn, and the clearing up and destruction of maggoty fruit.

Then during the winter we had warm days followed by severe frosts. The warm days would probably hatch the flies out, and the frost would kill them before they could do any damage. Now is the time for growers to be extra careful. Those with orchards free of the fly, or otherwise, should have a few tins of kerosene in the most likely trees, such as late peaches, quinces, figs, and pears. They should search their trees for maggoty fruit, and keep all fruit picked up, for it is the last broods of maggots which enter the soil, pupate, and carry over until next year, except some that may be hatched out during a hot day in winter. This brings me to the advisability of growers of citrus fruits watching their crops during the winter, and I would strongly recommend that at the end of the citrus fruit season, the trees should be completely stripped of all fruit, and a thorough search made so that not one odd fruit should remain, as it is these fruits that are liable to carry over the fly in a mild season, and thus give the flies a big start in the spring.

CEREAL CULTIVATION IN WESTERN AUSTRALIA.

INQUIRIES FROM THE FRENCH GOVERNMENT.

At the request of the French Minister for Foreign Affairs and the Minister for the Colonies, the Consul-General for France, in Sydney, asked to be supplied with *data* regarding the cultivation of cereals in this State, and the following information has been forwarded to him by the Department:—

March 23rd, 1909.

The Consular General for France,

Sydney.

Sir,

By direction of the Hon. the Minister for Agriculture, I beg to acknowledge receipt of your letter bearing on the cultivation of cereals in Western Australia, to which I am replying *serialim*:—

- (1.) The culture of cereals is now restricted to the South-Western Division of this State. Oats are found more profitable on the moister coastal lands and wheat on the drier country inland. For wheat, it is estimated that a minimum rainfall of nine inches is required, provided that rainfall is recorded (as is the case in this State) during the growing months, which extend from April to November.
- (2.) I am sending you a publication by the Government Statistician, which supplies the meteorological information asked for, as well as a map, which will enable you to locate the different places mentioned in the report. (V. Monthly Statistical Abstract, p. 30.)
- (3.) Also I am sending a Statistical Register of W.A., which on reference to Table 18, p. 23, will give you the average yields per acre of the crops named for ten years prior to 1906. (V. Part V.)
- (4.) Table No. 18 furnishes this information for the whole of the State.
- (5.) The altitude is 20 feet to 100 feet to the west of the coastal ranges, and from 600 feet to 1,200 feet from the coastal ranges inland.
- (6.) Oats are cultivated more extensively in the South-West corner of this State, where the rainfall is heavier, and as before stated, wheat in the drier regions (*vide* map).
- (7.) The varieties of wheat cultivated for grain are as a rule short, stout stalked, with narrow blades, while those for hay are longer, with broader blades, and stool more profusely. The varieties preferred for grain are:—Federation, Alpha, Lots, Bobs, Bunyip, Golden Drop, Petaz Surprise, Cross-bred No.

73; and for hay as well as for wheat:—Baroota Wonder, Steinweidel, Le Huguenot, Cross-bred 73, and Alpha. The two latter wheats have been evolved in Western Australia, and are particularly well adapted to local requirements, either as hay or for grain. They have also been tried with success in the Eastern States.

- (8.) On application, this Department will gladly supply samples for trial in the drier regions of Africa.
- (9.) Horses are used as draught animals in the regions named.
- (10.) Wheat or oats are cut with the reaper or binder when the grain is in the dough stage, dried and sun-cured in the field, then stacked until marketed, when it is put through the chaff-cutter and bagged. This constitutes the bulk of the horse-feed used. When the animals are hard at work, oats and bran are given as an additional ration.
- (11.) In the drier districts, land intended to be sown the subsequent season is ploughed after sowing time, and during the spring months it is subsequently cultivated to break the crust and destroy the capillary tubes, when it is left in that state until sown in April or May following, which is the beginning of the sowing season.
- (12.) Where the land has been thoroughly cleared and there are no stumps or roots, the ordinary set plough is used, but where stumps and roots have been left in the ground, stump-jump ploughs are used, usually of two or three furrows—either with the share and mouldboard or disc. Scarifiers used are either spring-tooth or disc.
- (13.) The land is ploughed from 4 to 8 inches.
- (14.) In new, sour ground, the light plough of about 4 inches gives better results than a deeper one of 7 to 8 inches. In older fields the deeper ploughing is recommended.
- (15.) Sowing is done during the autumn months, *i.e.*, from March until June, and in the moister districts right up to the end of July. In the Eastern districts with a light rainfall the sowing is done in the dry earth and before the rainy season commences.
- (16.) Generally with the drill, occasionally broadcasted. With the drill the seeds are set at an even depth, and are regularly distributed, together with the fertiliser.
- (17.) The ground is not harrowed after sowing if the drill is used.
- (18.) It is not usual to get rid of the weeds by hoeing.
- (19.) For harvesting the stripper is used, or, more recently, the harvester. Very few wheat crops are cut with the binder to be subsequently threshed. When the stripper is used, the grain is put through the winnower, which stands in the field, and is then bagged; when the harvester, the operation of stripping, threshing, winnowing, and bagging is done by the one machine. This is made possible owing to the fact that the grain crop is allowed to stand in the field during the dry, early summer months without fear of getting wet.

- (20.) If we take a crop grown on fallow land, which is the method of cultivation usually adopted in the drier districts, the cost would be somewhat as follows:—

	s.	d.
Ploughing	6s. to	8 0
Cultivating fallow	1	6
Drilling, seed, and manure	3	0
Cost of seed and pickling — $1\frac{1}{4}$ bush.	5	0
Manure — 84lbs. superphosphate	3	9
(a.) Rolling (if done)	1	3
Harvesting—4 horses	4	6
Bags—5 three bush., @ 8d. each, and twine 2d.	3	6
	30	6

If the crop is cut with the binder, and subsequently threshed, the cost will be as above, down to, and including—

Rolling, <i>i.e.</i>	22	6
Cutting with reaper and binder	3s. 6d. to	4 0
Twine	2	3
Stooking	2s. to	2 6
Carting and stacking	2	6
Threshing	2	6
Bags and twine	3	6
	39	9

	s.	d.	s.	d.
(21.) Wheat	3	0 to	3	6
Oats	2	6 to	2	9
Barley	2	6 to	3	0
Barley, Cape and malting	4	0 to	4	6

A. DESPEISSIS.

Under Secretary for Agriculture.

THE FERTILISER ACT.

By PERCY G. WICKEN, Inspector of Fertilisers.

By the courtesy of the Collector of Customs (Mr. Clayton T. Mason) we are able to publish a return showing the quantities and value of the fertilisers imported into the State during the past year. The return shows that a large amount of fertiliser has been used, as to this return has to be added the amount of bone-dust made in the State and the quantity of Albrohos guano sold. The statement shows continued increase of importations into the State, thus indicating that the farmers are making more general use of fertil-

isers. The quantity of bonedust imported in 1907 was 45,127cwts. of Australian origin, and 16,000cwts. from oversea origin. In 1908 we imported 43,688cwts. from Australian ports, and only 1,500cwts. from oversea. The total quantity is somewhat less than in the previous year, but we have more local bone mills at work than we had in previous years, and the output of these local mills is increasing. One of the most pleasing features of this report is the increase of the imports of fertilisers of Australian manufacture, and the decrease of those of oversea origin, therefore, let us hope that the next report will show still further improvement in this direction in favour of local production as against any outside source. If one of the firms engaged in the fertiliser industry could be induced to start works for the manufacture of sulphuric acid in this State, the manufacture of superphosphate would speedily follow, and the fact that last year we imported no less than 15,000 tons of superphosphate, valued at £50,344, seems to indicate that there is sufficient opening for the establishment of such works on modern lines. The increase in the total imports of all classes of fertilisers is from 18,554 tons in 1907 to 20,467 tons in 1908, or a total of 1,913 tons; and this is all due to the increased demand for superphosphates. The imports of this item alone have increased from 192,952 cwts. in 1907 to 300,193 cwts. in 1908, and the value from £31,000 to £50,000; and although in this item the oversea imports have largely increased, they have not done so in the same proportion as that from the other Australian States, the quantity imported from the East, principally Victoria, having increased from 28,000 cwts. to 82,000 cwts. during the year. If it is possible to manufacture superphosphates in Victoria and send them to this State and compete against the foreign article, it ought surely to be possible to manufacture locally to supply our own requirements.

Under the heading "Other names" we find a falling off from 111,693 cwts. in 1907 to 61,540 cwts. in 1908, but an increase in value of over £1,200, which indicates that fertilisers of much higher value have been imported, possibly more concentrated superphosphates, and also sulphate of potash. Guano has almost ceased to be imported, which means that the local product has secured full possession of the market. Nitrate of soda and sulphate of ammonia are used in such small quantities as to be hardly worth consideration. Next year it is expected that the guano found in the Namban Caves will be placed on the market; if the results of the trials being made this season are up to expectations a large quantity of this fertiliser should be used, and will no doubt help to reduce the quantity imported as well as keeping money in the country.

The total area of land under crop, including artificially sown grasses, in 1908 was 502,970 acres, and the total quantity of fertilisers imported was 409,344 cwts. If we add to this the amount of local fertiliser used, it will be seen that it works out at about 1 cwt. of fertiliser for every acre under crop, a quantity that cannot be considered excessive when we remember that the bulk of the bone-dust and nitrogenous fertilisers are used by market gardeners who go in for heavy manuring. Deducting this, and allowing that most of the superphosphate is used by the wheat-growers in the agricultural districts, we come to the conclusion that the quantity used for this purpose is much less than 1 cwt. per acre, probably nearer 84 lbs., a quantity which there is no doubt it would pay growers to increase, to double in fact, in order to obtain the best results.

MANURES.
Imports into the State of Western Australia for the Year 1908.

Statistical Item Number.	Articles.	Rate of Duty.	Countries whence Imported.	Quantities.			Value.	
				Australian Produce.	Overseas Produce.	Total.	Australian Produce.	Overseas Produce.
				cwts.	cwts.	cwts.	£.	£.
413	Bonedust	Free	New South Wales	16,160	...	...	4,657	...
			Victoria	26,456	...	...	6,842	...
			Queensland	1,000	...	...	284	...
			South Australia	72	...	...	23	...
			India	...	1,000	...	...	315
			Singapore	...	500	...	...	143
			Total	43,688	1,500	45,188	11,806	458
414	Guano	Free	Victoria	8	...	...	6	...
			United Kingdom	...	3	...	...	10
			Total	8	3	11	6	10
416	Superphosphates	Free	New South Wales	2,112	24	...	757	4
			Victoria	79,178	520	...	15,727	114
			South Australia	325	...	...	70	...
			Tasmania	940	...	...	230	...
			United Kingdom	...	180,446	...	...	27,738
			Belgium	...	9,000	...	...	1,459
			Germany	...	17,248	...	...	2,633
			Holland	...	10,400	...	...	1,712
			Total	82,555	217,638	300,193	16,784	33,560
								50,344

WEST AUSTRALIAN FRUIT IN CEYLON.

(“Times of Ceylon.”)

Mr. E. W. Hoseason, of the West Australian Import and Export Co., who has been in Colombo a fortnight opening up a trade in West Australian fruit in Ceylon, when asked by a representative of the “Times of Ceylon” as to what progress he was making, replied “At the outset I was very much disappointed as I came with my hopes, metaphorically speaking, glued on the hotels and the passenger ships and I found that the hotels and shipping companies do not appear to be inclined to place orders.”

What is the argument of the hotel managers?

“The contentions of the hotel directors are that they have to keep expenses down, and that it would not pay to take West Australian fruit. These explanations are practically one and the same. Naturally, West Australian fruit would be dearer than Ceylon fruit, but possibly not prohibitive to Colombo hotels, which, from the annual reports, are flourishing—and the expenditure on this item would show an advance. As regards the statement that West Australian fruit would not pay, the argument is that patrons of the hotels, finding that there was a good fruit on the table, would more likely than not eat fruit the cost of which would be in excess of the tariff, and also eat more of it than they would of the much cheaper native fruit, and probably, if they had the opportunity and were vegetarians, would make a meal of it.”

You could meet that argument by pointing out that Colombo hotels charge for mangosteens?

“Yes, and I also recognise that it is more profitable for hotels to give pineapples, papaws, plantains, etc., which are comparatively cheap, being local, instead of the dearer—but I contend infinitely better—West Australian fruit. Supposing the hotels did take West Australian fruit, I do not lose sight of the fact that when the statistics of the cost per meal came to be worked out, they would possibly show a slight advance when compared with corresponding dates, and that in itself is enough to make hotel managers consider. However, as a small consolation, one hotel has promised to take, if I can supply, West Australian fruit when there are special parties. As regards the Kandy and Nuwara Eliya hotels, I had satisfactory answers from neither. But, to come back to what you were saying about charging for fruits, I have also had in mind making a separate charge for Australian fruit, say 50 or 75 cents., and when it is remembered that 50 cents. can buy a lb. of grapes this suggestion commends itself as a possible way of keeping the hotel fruit bill normal.”

What is the position of the shipping companies?

“The shipping companies tell me that the ships either take on board, for consumption, native fruit or bring their supplies with them from Aden or Australia. With reference to the suggestion that Australian fruit should be brought up here and distributed amongst the various lines calling at the port and going to the Far East, Calcutta and elsewhere, the storage obstacle is a difficult one, as fruit gives way quickly—pears even do so on the

run up. At least a week's supply in advance would require to be kept in the Colombo cold storage to meet the demands, and, as I have said, the difficulties of keeping the fruit from decaying or losing it altogether are several."

You said you were disappointed at the beginning; what is the position now?

"I am not disappointed as far as the ordinary trade is concerned. By last steamer I received 30 cases of grapes and 10 cases (400lbs.) pears, and all were sold within 24 hours of landing. One house has already come forward and offered to buy the whole of the shipment arriving to-day, whatever it may be. I have not received my invoices yet, but if I get a hundred cases, I can have them all placed within 24 hours. That I think speaks for itself, and shows that private houses will have on their tables fruit very much superior to the hotels."

Mr. Hoseason explained in conclusion that he was sending down to West Australia for consumption, and to see how they would be accepted, plantains, pineapples, and mangoes.

POULTRY NOTES.

By FRANK H. ROBERTSON.

REPORT OF FOURTH EGG-LAYING COMPETITION.

The third Egg-laying Competition at Subiaco was completed on the 31st March, and with the first (which was held at Narrogin), makes the fourth competition, which, like all its predecessors, was under the supervision of the Agricultural Department of this State.

The event just completed was only for nine months, so that the period of future competitions may fall into line with those of the Eastern States. The shortness of the period has robbed the event of interest so far as regards comparison of results is concerned, owing to the full 12 months being the term for all previous contests, with one exception, viz., at Queensland, and which recorded much smaller totals; the highest score being 938 eggs, against our 1,112. In comparing the monthly egg yield with previous years' competitions, the results do not look satisfactory, but it must be remembered that several pens of both fowls and ducks remained from the previous competition to compete against the fresh lot of young birds, so naturally it is not fair to make a comparison with former events, as it is well-known that birds lay best during their first year. The returns herewith show the laying of each pen for the two years, which were entered for the second test; from this it is clearly seen that there is a very much better egg yield from pullets than from second season birds. The difference is, however, not nearly so great as regards the ducks. The figures to the left of each Monthly Result in the Second Year Test Lists give the number of eggs laid during the first year.

It is pleasing to note that our local breeder, Mr. S. Craig, of Belmont, has attained the honour of winning the competition. His birds are consistent

performers, as in previous events he secured third and sixth, which were won by Sunnyside Farm and Mr. A. H. Padman. Mrs. A. S. Craig, of North Fremantle, occupies second position with a good-looking pen of Black Orpingtons. These birds showed remarkable laying qualities for a breed generally considered as a general purpose variety, they looked like winning at one time, but the Leghorns passed them during the last month. The second year's test was won by Mr. John Stuart's Golden Wyandottes, which made such a good second in the previous competition. Messrs. Craig Bros. are second, and they were third in the former competition.

The duck contests are remarkable for the good laying of the second year birds, and a month back it looked as if Thomson's last year's winners would again score first honours, but Whitfield's pen got through the moult quickly, and finished well and strong. Had the test continued for another three months it is likely that some high records would have been made, as most of the ducks were getting into full work. Mr. F. Whitfield, formerly of Boulder, where he was long identified as a successful breeder of Indian Game, recently purchased Mr. Disting's farm and stock, and is to be congratulated on winning this competition. Mr. G. Thomson's Indian runners, which made the great record of 1,571 eggs in the previous competition, still kept up in a remarkable manner; they easily won the second year test, and looked at one time as if they would beat all the young birds in the open test.

Mr. G. Allman was in charge, as in the two former competitions, and Mr. Davis as his assistant.

The feeding of the stock was much the same as in former years, but no meat was used, its place was taken by boiled blood, which is found to answer admirably. Lucerne chaff was largely given, and it is still found to be a splendid substitute for fresh greenstuff.

The health of the birds was very good right through the competition; the deaths were 6 hens, 2 cocks, and 6 ducks.

The eggs were sold to one wholesale firm, both duck and hen eggs fetching the same price, and ranged from 1s. in September to 2s. in March, as the competition finished on 31st March. No prices are quoted for the dear months, viz., April, May, and June.

Appended are the returns showing amount of feed consumed, and cost of same, receipts, and market range of prices, also records of the eggs laid by each pen.

HENS.

RECEIPTS.		doz.	£	s.	d.	EXPENDITURE.		£	s.	d.
By	Market Eggs	..	3,814	233	0	6	Pollard	..	..	41 18 8
..	Com. on Settings	..	205½	28	13	6	Bran	..	..	11 13 1
..	Eggs sold to owners		199½	19	19	0	Wheat	..	..	50 16 2
..	Breakages	..	50.9				Lucerne Chaff	..	..	6 10 9
							Oats	..	..	4 15 2
							Maize	..	..	3 15 4
							Blood	..	..	10 1 6
							Oil Cake	..	..	2 6 0
							Green Feed	..	..	3 0 0
							Grit	..	..	2 18 6
							To Balance	..	..	143 17 10
			4,269.9	281	13	0			£	281 13 0
							By Balance	..	..	£143 17 10

DUCKS.

RECEIPTS.	doz.	£ s. d.	EXPENDITURE.	£ s. d.
By Market Eggs ..	1,500	87 9 10	Pollard	16 1 7
„ Com. on Settings ..	32½	7 15 10	Bran	5 11 3
„ Eggs sold to owners	35	3 10 0	Lucerne Chaff ..	4 0 0
„ Breakages	24½	..	Blood	12 8 0
			Oil Cake	3 6 0
			Green Feed	2 9 11
			Grit	3 17 6
			To Balance ..	51 1 5
doz.	1,591 7½	98 15 8	£	98 15 8
			By Balance	£51 1 5

FOOD CONSUMED BY FOWLS AND COST PER HEAD.

		£ s. d.	
Pollard	592 bushels ..	41 18 8	
Bran	164½ bushels ..	11 13 1	
Wheat	234½ bushels ..	50 16 2	
Lucerne Chaff ..	12½ cwt. ..	6 10 9	
Oats	25 bushels ..	4 15 2	460 head
Maize	13 bushels ..	3 15 4	5s. 11½d. .49.
Blood .. ..	.. ..	10 1 6	
Oil Cake	5 cwt. ..	2 6 0	
Green Feed .. ..	.. ..	3 0 0	
Grit	13 cwt. ..	2 18 6	
	£	137 15 2	

FOOD CONSUMED BY DUCKS AND COST PER HEAD.

		£ s. d.	
Pollard	227 bushels ..	16 1 7	
Bran	78½ bushels ..	5 11 3	
Lucerne Chaff ..	8 cwt. ..	4 0 0	
Blood .. ..	.. ..	12 8 0	156 head
Oil Cake	7 cwt. ..	3 6 0	6s. 1½d., .61.
Green Feed .. ..	.. ..	2 9 11	
Grit	17 cwt. ..	3 17 6	
	£	47 14 3	

MARKET RANGE OF PRICES.

July	1s. 10d. to 1s. 2d.	December	1s. to 1s. 4d.
August	1s. 4d to 1s.	January	1s. 4d. to 1s. 5d.
September	1s.	February	1s. 5d. to 1s. 8d.
October	1s.	March	1s. 6d. to 2s.
November	1s. to 1s. 2d.		

THIRD EGG-LAYING COMPETITION AT SUBIACO.

[Commenced July 1, 1908. Closed March 31, 1909.]

Won by Mr. S. Craig's (Belmont, near Perth) White Leghorns.

The figures in black indicate the winner of the monthly prize.

The first column of figures indicates the position of the pens at the close of the competition.

Pens marked thus * remained in from last competition.

FOWLS.

Six females and one male bird in each pen.

Owner and Breed.		FOWLS.												Weight of Eggs. ozs.	Market Value.		
		July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Total.	£	s. d.				
1	S. Craig, White Leghorn	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2	Mrs. A. S. Craig, Black Orpington	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3	A. H. Padman (S.A.), White Leghorn	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
4	Gaffney & Bach, White Leghorn	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
5	Mrs. C. F. Schmidt, White Leghorn	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
6	Sunnyhurst (S.A.), White Leghorn	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
7	Mrs. A. E. Kinnear (S.A.), White Leghorn	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
8	Mrs. Kynaston, White Leghorn	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
9	G. Bolger, White Leghorn	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
10	C. Herbert, White Leghorn	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
11	Mrs. L. Mellen, White Leghorn	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
12	Homebush Farm, White Leghorn	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
13	Paddy King & Salter, White Leghorn	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
14	T. W. Martin, White Leghorn	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
15	Lionhurst Poultry Farm, Buff Leghorn	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
16	A. M. Thomas, White Leghorn	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
17	Shamrock Poultry Farm, White Leghorn	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
18	Greenville Poultry Farm, White Leghorn	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
19	Glendonald Poultry Yard, Silver Wyandotte	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
20	T. Ockerby, White Leghorn	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
21	C. B. Bertelsmier (S.A.), White Leghorn	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

22 J. W. Buttsworth, White Leghorn	113	133	117	113	78	91	118	76	47	886	244 $\frac{1}{2}$	4	10	91
23 W. Elliot, White Leghorn	89	109	109	114	88	103	104	95	68	879	25	4	10	71
24 Bon Accord Poultry Yard, White Leghorn	94	119	102	116	79	98	110	92	59	869	24	4	9	64
25 E. G. Flynn, White Leghorn	86	92	88	101	104	106	128	108	43	856	24	4	8	4
26 J. Gaffney, White Leghorn	83	106	119	112	102	98	87	70	72	849	23 $\frac{1}{2}$	4	6	8
27 Mrs. Younger, White Leghorn	41	97	121	126	103	97	110	91	55	841	27	4	4	63
28 Mrs. Flynn, White Leghorn	78	94	114	111	90	101	105	81	58	832	24 $\frac{1}{2}$	4	5	1
29 Mrs. Hobbey, White Leghorn	87	118	111	110	80	91	100	95	29	831	23	4	5	0
30 E. Garbett, White Leghorn	71	129	120	120	85	88	104	79	24	820	22	4	1	9
31 Coolgardie Poultry Farm, White Leghorn	66	97	110	112	96	92	93	94	56	816	24 $\frac{1}{2}$	4	1	8
32 Greenville Poultry Farm, Silver Wyandotte	105	97	107	110	88	76	85	70	74	812	23	4	4	0
33 J. R. De Morrison, White Leghorn	61	104	108	105	82	90	104	86	64	804	24 $\frac{1}{2}$	4	2	2
34 Ontario (S.A.) White Leghorn	72	82	106	140	75	94	113	88	29	799	23	4	0	6
35 Honner & Forbes, R.C. White Leghorn	69	99	111	114	85	85	100	86	50	799	23	4	1	2
36 O.K. Poultry Yards, White Leghorn	34	106	119	115	92	101	105	4	46	782	23 $\frac{1}{2}$	3	17	8
37 Mrs. Hughes, White Leghorn	57	92	126	116	75	73	111	87	36	773	23	3	17	9
38 *J. D. Wilson, Brown Leghorn	42	84	110	117	104	89	111	79	37	773	25	3	17	4
39 *T. W. Martin (late O. James), W. Leghorn	62	104	114	93	76	88	87	88	55	767	24 $\frac{1}{2}$	3	18	3
40 A. E. Champness, White Leghorn	40	108	109	110	76	81	94	80	64	762	23 $\frac{1}{2}$	3	17	2
41 The Elms Poultry Yard, White Leghorn	51	92	111	124	96	86	92	61	43	755	26	3	15	3
42 *White Wings P.F. (No. 2), White Leghorn	71	93	103	111	63	85	104	91	34	755	25	3	16	11
43 *Adelaide Poultry Yard, R.C. Brown Leghorn	62	99	106	96	74	84	82	89	56	739	23 $\frac{1}{2}$	3	15	5
44 Mrs. McGree (No. 2), White Wyandotte	40	90	108	81	94	86	92	89	58	738	24	3	16	0
45 Adelaide Poultry Farm, Buff Leghorn	33	82	104	106	87	85	86	71	77	731	24 $\frac{1}{2}$	3	14	3
46 Devine & Migro, White Leghorn	58	94	115	121	100	63	99	51	27	728	24 $\frac{1}{2}$	3	12	10
47 Craig Bros., Black Orpington	70	97	90	121	96	69	76	53	56	728	21 $\frac{1}{2}$	3	13	7
48 *Craig Bros. (No. 1), White Leghorn	30	93	88	103	81	74	118	106	27	720	25 $\frac{1}{2}$	3	12	7
49 G. George, White Leghorn	66	96	103	106	85	79	77	69	37	711	22	3	12	3
50 S. Perth Poultry Farm, E.C. White Leghorn	61	91	92	108	87	79	90	65	38	711	26	3	11	7
51 *White Wings P.F. (No. 1), White Leghorn	52	65	80	96	85	75	84	93	69	699	26 $\frac{1}{2}$	3	12	7
52 T. Hickey, White Leghorn	0	84	130	102	64	99	120	80	16	685	20 $\frac{1}{2}$	3	7	11
53 *Mrs. McGree (No. 1), White Wyandotte	49	107	91	99	59	70	87	67	52	681	24 $\frac{1}{2}$	3	9	1
54 F. Whitfield, Minorca	57	71	89	122	83	76	73	57	44	672	29	3	7	1
55 *J. Stuart, Golden Wyandotte	69	101	99	103	77	51	41	40	66	647	23 $\frac{1}{2}$	3	5	5
56 Hillview Poultry Farm, White Leghorn	51	92	83	89	81	79	79	54	30	638	27	3	3	11
57 *J. Stuart, S.P. Wyandotte	33	74	101	94	77	60	55	52	41	587	25 $\frac{1}{2}$	2	18	2
58 Craig Bros. (S.A.) (No. 2), White Leghorn	49	81	90	88	61	49	61	39	37	555	22 $\frac{1}{2}$	2	15	5
59 *Mrs. H. M. Kelley, White Leghorn	23	68	106	104	60	61	48	49	22	541	27	2	12	6
60 *Mrs. H. M. Kelley, Gold Wyandotte	33	85	96	92	76	65	44	21	21	533	23	2	11	4

EGG-LAYING COMPETITION—continued.

FOWLS—continued.

Owner and Breed.	Weight of Eggs.												Market Value.		
	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Total.	ozs.	£	s.	d.	
61 R. L. Martin, Black Orpington	...	95	84	69	62	71	41	56	51	33	526	26	2	13	7½
62 J. Stuart, S.L. Wyandotte	...	57	72	83	62	79	58	46	35	27	519	24½	2	11	11½
63 Craig Bros., White Orpington	...	57	73	60	67	48	54	43	44	19	465	24½	2	7	0¼
64 *J. Miller (late Dobson), Silver Wyandotte	...	34	59	40	38	36	34	25	32	30	328	22½	1	13	7¼
Totals	...	4,386	6,527	7,059	7,223	5,659	5,685	6,242	5,148	3,308	51,237				
Totals in 1907-8 competition	...	4,696	7,272	8,092	8,137	7,260	6,873	5,681	4,910	3,858	56,779				

Winner of first monthly prize, Mrs. A. S. Craig, Black Orpingtons, 131 eggs; second month, Mrs. A. S. Craig, 145 eggs; third month, A. H. Padman, White Leghorn, 146 eggs; fourth month, Mrs. Craig, Black Orpingtons, 146 eggs; fifth month, S. Craig, White Leghorns, 135 eggs; sixth month, S. Craig, White Leghorns, 137 eggs; seventh month, Sunnyhurst White Leghorns, 133 eggs; eighth month, Paddy King and Salter's White Leghorns, 147 eggs; ninth month, S. Craig, White Leghorns, 112 eggs; Winner of first three months test, Mrs. A. S. Craig, Black Orpingtons, 405 eggs.

Winner of last three months test, Mr. S. Craig, White Leghorns, 356 eggs.

DUCKS.

Six ducks and one drake in each pen.

Won by Mr. F. Whitfield's (Carlownie Poultry Farm, Leederville) Indian Runners.

Owner and breed.	Weight of Eggs.												Market Value.		
	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Total.	ozs.	£ s.	d.		
1 F. Whitfield, Indian Runner	106	148	146	156	132	128	109	63	111	1,099	29	5	11	7	
2 *G. Thomson, Indian Runner	...	131	135	150	142	131	100	88	94	96	1,067	36	5	9	5
3 *Mrs. L. Mellen, Indian Runner	...	131	141	154	149	101	95	86	90	88	1,035	32	5	5	8½
4 C. Phillips, Indian Runner	...	101	117	144	150	140	128	99	91	42	1,012	30½	5	1	1½
5 C. W. Johnston, Indian Runner	...	24	26	120	165	177	143	155	101	94	1,005	28¾	5	2	0
6 *Smith & Davenport, Indian Runner	...	116	128	136	154	125	99	105	86	55	1,004	32½	5	0	1½
7 J. Robertson, Indian Runner	...	32	108	179	143	139	119	102	78	76	976	33½	4	16	2½
8 White Wings Poultry Farm, Buff	...	114	177	162	166	63	101	74	15	96	968	32½	4	16	6½
9 D. F. Vincent, Indian Runner	...	119	132	133	177	123	64	57	42	35	882	29	4	6	4½
10 H. Carr and Son, Indian Runner	...	142	137	136	118	95	72	43	47	57	847	29¾	4	5	9¾
11 C. Geddes, Indian Runner	...	89	134	134	135	70	92	92	38	843	33½	4	3	9	

12	Bon Accord Poultry Yard, Buff	...	54	86	132	137	110	106	75	43	95	838	334	4	4	21
13	A. W. Edgar, Indian Runner	...	12	96	149	152	127	123	103	45	28	835	32	3	19	63
14	Simplex Incubator Factory, White Indian R.	...	4	9	109	162	94	125	122	118	92	835	29	1	5	61
15	*South Perth P.F. (No. 2), Pekin	...	7	116	160	147	116	120	106	37	6	815	355	3	16	24
16	Mrs. R. B. Moyle, Indian Runner	...	132	127	92	113	84	74	92	54	16	784	294	3	19	08
17	Grenville Poultry Farm, Indian Runner	...	68	85	140	128	47	98	92	66	50	771	294	3	17	9
18	*F. Whitfield (late Disting), Ind. Runner	...	72	48	108	128	127	71	84	64	55	757	293	3	16	51
19	J. Moyle, Indian Runner	...	114	115	137	102	90	39	52	37	19	705	294	3	9	51
20	Coolgardie Poultry Farm, Pekin	...	0	10	143	106	127	118	99	23	16	702	364	3	7	94
21	Adelaide Poultry Yard, Indian Runner	...	49	105	122	124	91	81	58	15	24	669	321	3	3	83
22	S. Perth Poultry Farm (No. 1), Pekin	..	0	50	137	145	139	100	69	6	1	647	331	2	18	11
Totals			1,617	2,260	3,023	3,069	2,448	2,196	1,962	1,274	1,220	19,099				
Totals in 1907-8 competition			1,368	2,712	3,405	3,506	3,303	3,014	1,848	1,169	1,012	21,337				

Winner of first monthly prize, H. Carr and Sons, Indian Runners, 142 eggs; second month, White Wings Poultry Farm, Buffalo, 177 eggs; third month, J. Robertson, Indian Runners, 179 eggs; fourth month, D. F. Vincent, Indian Runners, 177 eggs; fifth month, C. W. Johnson, Indian Runners, 177 eggs; sixth month, C. W. Johnson, Indian Runner, 143 eggs; seventh month, C. W. Johnson, Indian Runners, 155 eggs; eighth month, Simplex Factory, White Indian Runners, 118 eggs; ninth month, F. Whitfield, Indian Runners, 111 eggs.

Winner of first three months' test, White Wings Poultry Farm, Buff Orpingtons 453 eggs.

*SECOND YEAR'S TEST—FOWLS.

[illegible]

CITRUS FRUIT STOCK.

CULTIVATION IN SOUTH AFRICA.

The following correspondence will be of interest to fruitgrowers as bearing on the most suitable stocks for citrus trees, and also on the difference in conditions existing in this State and Cape Colony.

Under date 14th December, 1908, the Government Entomologist of Cape Colony wrote to the Director of Agriculture as follows:—

“Dear Sir,—At the time of his passing this port on his way back to Western Australia, I had the honour to present Mr. Chas. Harper with four young Naartje trees, the same being given as a present from this Department of Agriculture to yours. Just as his boat moved from the wharf I mentioned to Mr. Harper that these trees were on rough lemon stocks and he shouted back the surprising information that this stock was not a success in West Australia and that the Bitter Seville was used. I say “surprising” because the Bitter Seville as a stock has proved a failure wherever it has been tried in this country, and it has been tried under the most diverse conditions. Its use was unfortunately advocated by this department ten to fifteen years ago and its non-success gave the planting of budded orange trees (as opposed to seedlings) a severe set-back from which it has not yet recovered. Naartjes and lemons do better than sweet oranges on the root, and some varieties of oranges do better than others, but the stock is considered a real success for none. The Washington Navel orange dies out in a few years time. The pamplemousse stock lasts better than Seville but it, too, is failing in most places where planted, although until the trees on it had fruited a few years they grew vigorously. Now we have almost entirely reverted to the Rough Lemon.

“Our experience with the Seville was the same whether the strain used was an old colonial production, the Florida sour, or the European variety. A fully satisfactory explanation for the failure has not been determined, and therefore I would be much interested to know more of the experience in your country, and if there is any reference in your publications stating the conditions and circumstances under which your growers find the stock to succeed and *vice versa*, I wish you would oblige me with a copy for our information. We desired to use the stock as a safeguard against Mal-digoma.”

A copy of the above letter was forwarded to two of the leading citrus fruitgrowers in the State with a request that they should give their own experiences in the matter. Replies were received from both the gentlemen referred to, the substance of which was communicated to the Cape Colony Entomologist for his information. These replies are also reproduced below:

Mr. J. Hawter, of “Blackwood Nurseries,” Mullalyup, wrote:—

“Dear Sir,—In reply to your esteemed favour of 2nd inst. (466/9) *re* most suitable stocks for citrus trees.

“I fully endorse, after 22 years’ experience in the growing of citrus trees in Western Australia, the opinion of our Cape friends, that the

hardest and most resistant stocks to either extreme drought or excess of moisture is the Citronnelle stock. The opinion that quality of fruit deteriorates does not apply in Western Australia. The Parramatta or Seedling orange pips I find the next best. Florida sour and Seville stocks, so much used in older countries, are excellent for some varieties, but others refuse to thrive on this root. The Pomelo stock turns yellow after a few years. The Trifoliata or Japanese is slow growing but very fruitful and stands frosts better than other stocks."

Mr. R. Cowen, of "Valencia," Mundijong, replied on March 4th, in the following terms:—

"Sir,—I have, in answer to your enquiry *re* the most suitable stock for oranges and lemons, to submit the experience I have had during twenty-two years both in America and Australia.

"Florida Sour Seville.—The stocks used in Florida, U.S.A., from 1885 to 1890 were there known as Sour Seville (common) rough lemon, sweet seedlings and grape fruit seedlings. The first used to grow wild along the swamps on the Hammock Sand, and I believe these were brought to the shores by the Spaniards and distributed by the Indians on trail. I might say that this orange was totally different to what we know here in Australia as a Sour Seville, and what we would obtain from a nurseryman if we ordered under that name, and I have not seen a true type in this country.

"Advantages of Sour Stock.—The advantages of this stock in Florida were hardiness, early and heavy bearer, and regular (except in the case of Navel oranges) less subject to disease, and very rarely attacked by collar rot; when budded with oranges, this disease being more noticeable when lemons were the fruit grown on it.

"Disadvantages of Sour Stock.—Very slow growth compared to other stocks and not so suitable for lemons on this account or for grape fruit for the same reason, a collar forming at the junction of the bud and stock.

"Florida Rough Lemon.—This stock is also quite different to our rough lemon and Citronelle, but does not differ so much as in the case of the orange, and for an all purpose stock I think would give the best results, it being a faster grower and just as good and heavy bearer and more easily budded.

"Seedling Grape Fruit.—This stock is hardly worthy of mention, but was tried on account of being such a strong grower; it was found, however, to take some seven or eight years to produce a crop and was discarded for that reason.

"Sweet Seedling Orange. (This applies to all countries.)—My experience of this stock is that it is a shy and more uneven bearer, heavy crop one year, light the next, in consequence large and small fruit alternately and shows the nature of a seedling in taking longer to produce a crop.

"Rough Lemon. (Citronnelle, W. Australia.)—This is not identical with the Florida rough lemon, although in looks it resembles it, in shape it takes more after an orange.

"I took particular notice of this stock before I had been in Western Australia many months, growing as it did under very adverse conditions, and seemed very thrifty, and in this respect it reminded one of the Florida rough lemon. I at once chose this as stock for my trees here and have never regretted it, although nurserymen tell me I am one of the few growers who

ask for it; at the same time I find in competition with other growers at shows I can win against the other stocks every time.

"Florida experience.—The experience I gained in Florida would be to use the Florida Sour Seville as stock for oranges and mandarins and the rough lemon for lemons or grape fruit.

"Western Australia.—Rough lemon or Citronnelle I use here for all three lemons, oranges, and mandarins, and find it a sure and regular cropper not subject to collar rot when grown under fair conditions, excepting in cases of lemons and they are subject to it on all stocks.

"My advice to growers is, use the stock which will grow under the most adverse conditions in the country in which he proposes to grow citrus, and not to adopt something because he reads it in a book from some other country, where, in most cases, the conditions are totally different; in my opinion there are more failures from this cause than any other. Climatic conditions are the first essential."

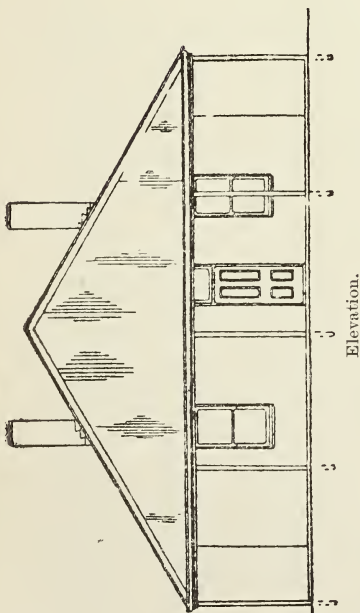
BUILDINGS IN THE BACKBLOCKS.

(The Pastoralists' Review.)

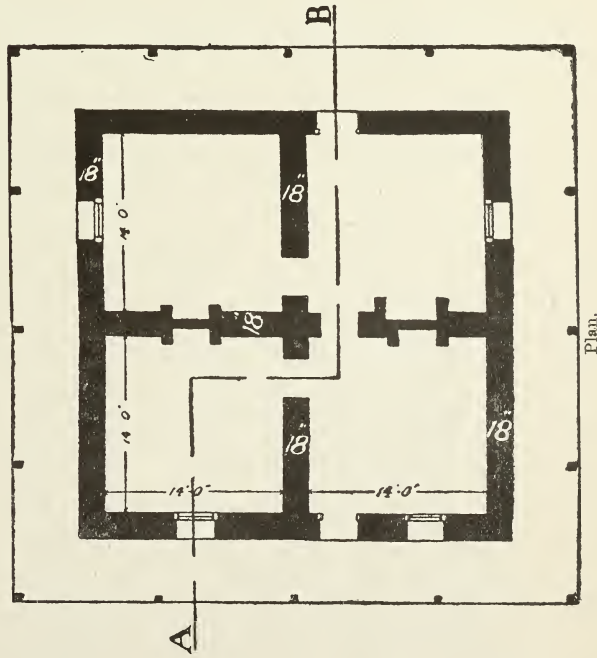
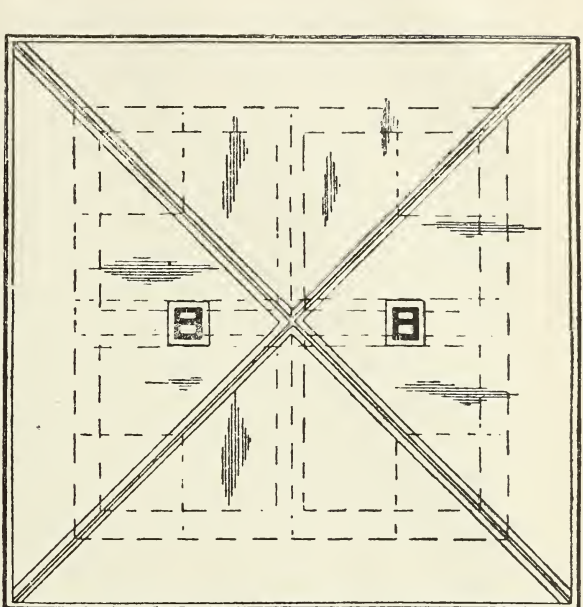
Anyone who is in the habit of moving about the backblocks of Australia will be familiar with the ramshackle structures which do for homes for the small farmers. Slab sides, patched up with tin, and a bark roof, is not by any means an uncommon style of dwelling to be seen out back. On every hand there is evidence of a great need for a better style of building, and whatever it is built of, it must be cheap. Galvanised iron possesses the advantages of being weather-proof, lasting, and easy to handle, but it has the disadvantage of accentuating the heat of summer and the cold of winter, besides being expensive.

The South Australian Department of Agriculture is at present directing attention to this matter, and has invited suggestions in regard to building cheap, but better homes in the backblocks. One of the results of these investigations is the following recommendation by Mr. T. M. Smeaton. He writes as follows:—

"In the thinly-rolled sheets of 'fibro-cement' which have recently come into the market, I think there lies the solution of the problem of how to reduce to a minimum the discomforts of life in the makeshift home of the backblocks. Fibro-cement is rolled out in thin sheets in two sizes, the larger 8 x 4 ft., and the smaller 4 x 4 ft.; the sheets are of two thicknesses, $\frac{3}{8}$ in. and 3-16 in., and the price is 4s. 9d. per yard for the thicker and 2s. 9d. for the thinner. The sheets are hard and tough, not easily broken, can be cut with the saw or chisel, can be planed and nailed like any ordinary piece of wood, but with the great difference that they never split in nailing. The greatest advantage of all is that fibro-cement is a non-conductor of heat and cold, and is fireproof. With all these qualities, it will be patent to settlers that in this material they have a much better friend than the galvanised iron



Section A B.



or weatherboards, which have hitherto provided their handiest and cheapest means for house-building. In my own practice I have used a great deal of it, and I can confidently recommend it as a material which should be invaluable to those who cannot build with brick or stone. Supposing you want to put up two rooms to start with. You begin by putting down jarrah or red gum stumps about 9 in. in diameter, set 5 ft. apart, and 1 ft. in and 1 ft. out of the ground. These are to go under your walls and under the plates that support the floor. Put wall plates of 5-in. x 3-in. jarrah spiked down to the stumps. On this erect the framework of your house, the corner posts 4-in. x 4-in. jarrah, according to the height you want your rooms. The studs, wall plate, ridging and rails should be of 4-in. x 1½-in. jarrah, and the studs set about 12 in. apart, but spaced so that the joining of the sheets of fibro-cement shall come on the centre of a stud, and similarly with the horizontal joints, on a rail. Doors and windows will, of course, be trimmed for in the framing. The cost of doors with framed linings is about 22s. the set, and box frame windows, with lifting sashes, 25s. the set. The floor should be laid with 7⁄8-in. floor boards on 4-in. x 3-in. jarrah joists, and will cost about 35s. per square (100 ft. super.) for the material. The price of studs will be about 1 1-3d. per lineal ft. The outside lining of the walls should be fibro-cement 3-16-in. thick, secured to the studs with ¾-in. nails or clouts at intervals of 6 in. The inside lining may be of matchboards, costing 7s. 6d. per 100 ft. lineal—if lined at all—or cheese cloth covered with paper. If a stove is used, the pipe should be passed through the wall to the outside, taking care to keep it free from the wood. I have never used fibro-cement as a roof cover, but would not hesitate to do it if need be; still, I advise covering the roof with galvanised iron outside, and lining the ceiling inside with fibro-cement. By doing so the maximum of coolness will be achieved in summer."

Mr. C. E. Owen Smyth, Superintendent of Public Buildings, advocates the adobe house as the best dwelling for the settler in the country. As he says, it is cool and economical, and the man who has a couple of lads to help him, should begin by digging out a good-sized cellar and using the stuff so obtained as adobe. The clay can be strengthened by adding straw, small twigs, reeds, etc., and then rammed between boards to form the walls. The boards can be used afterwards for roofing, and so forth. When the walls are up, they should be treated on the outside with ordinary lime-mortar, to which should be added, say, 25 lbs. of black sugar to the cubic yard of mortar. The sugar is made into a syrup and mixed with the mortar, after which the compound should be used at once. In this way a ½-in. coating would be spread over the wall as a preservative. Round the base of the walls, under the verandah, should be placed about 6 in. of concrete to keep moisture from getting in. The wall would require no foundation, being simply placed on the surface of the ground. Let the roof project 5 to 6 ft., and use strong sapling verandah posts if red gum or jarrah is considered too expensive.

By this means the walls will be protected from the direct rays of the sun. They may be anything from 18 in. to 2 ft. thick, and it would be advisable to set some flat stones or a few bricks in the clay at the corners, so as to form a sort of coign. Similarly, if bricks were built into the adobe in the door openings, as the walls rise, and then treated with sugar-mortar as above, it would make the structure quite weather-proof.

For roofing, use 24-gauge galvanised iron, because, although a little dearer, it is better in the end than 26-gauge. For ceilings, use small-fluted 28-gauge iron. If anywhere near the seacoast, obtain dry seaweed, and put

it on sheets of paper between the ceiling and the roof. If the settler is in the hills, let him burn charcoal, and put a layer 6 in. deep above the ceiling. Either of these will be found a wonderful preservative against heat. White-wash the interior with two or three coats of hot lime mixed with a little sugar. The floors should be of concrete. A very cheap and excellent kitchen floor is constructed in South Africa of a mixture of clay and cowdung tamped hard. Make the concrete of gravel and lime, about six parts to one: lay it about 4 in. thick, tamp hard, and trowel off to a smooth surface.

Of course, a certain amount of technical knowledge is required to make a successful job, but a little of it will enable a man to construct in adobe a much more comfortable house to live in than can be obtained with the ordinary 14-in. stone wall. Adobe is a much less active conductor of heat than stone, especially where the roof projects and keeps the direct rays of the sun from the wall for the greater part of the day.

Another method of construction, where sand is plentiful and it is possible to burn lime, is to make sand-bricks, each about the size of a kerosene tin. These can be used like big bricks to build the wall, with a lime-mortar joint. They make excellent walls, especially with sugar-mortar outside. Those who can afford it may put a 4½-in. brick wall inside the sand-brick wall, leaving an air-space of 2 in. between them, and stiffening them with ties of hoop-iron in the form of the letter S. This forms a very cool house. There is no reason why the inner wall should not also be constructed of sand-bricks, if so desired, making them of a larger size than the ordinary brick, but only 4½ in. thick, and using the ties as before. A coating of lime-mortar can then be given.

FRUIT - FLY.

(*Trypeta musae*).

INFECTED ORANGES.

A consignment of oranges received from New South Wales on January 28th, upon examination at the fruit inspection sheds, Fremantle, was found to contain several oranges badly infested with the larvæ of a species of fruit-fly. These were forwarded to the Assistant Entomologist, who bred them out and identified them as *Trypeta musae*, commonly known as the Island Fly, and reported as having been introduced to New South Wales from the New Hebrides. According to the Annual Report of New Zealand, this fly is becoming especially prevalent in Sydney citrus fruits, and apparently widely distributed in New South Wales. This pest is also found in Queensland.

The fruits affected contained up to 200 maggots each. The maggots are very active, and slighter than the larvæ of the local fly (*Ceratites capitata*), otherwise look much the same. Mr. Froggart, of New South Wales, describes the fly as follows:—"Head and thorax dull yellow, no distinct dorsal stripe on the thorax, and the wings thickly mottled. The fly can be recognised by the peculiar wing action when crawling about."

THE DENMARK ESTATE.

Between Bridgetown and Albany there are thousands of acres of some of the richest land in the State—land fertile in itself, subject to a temperate sun and a liberal rainfall, and demonstrably capable of carrying grass as well as being adapted for many branches of intense culture. Yet such is the nature of the timber occupying the land that settlement and cultivation must be literally carved out of the forest. To the would-be settler the conquest of those acres upon acres of giant karri, jarrah, and red gum is a leviathan contract, requiring a strong heart, tireless muscles, and a purse like the widow's cruse. Land that should be the home of the dairying industry is held secure by battalions of forest Goliaths that mock the puny efforts of the individual settler.

But with a growing ambition amongst the people that the State should load its table with its own products—with an increasing shame of the fact that Western Australia's unproductiveness should employ 10,000 people in the other States—the question is for ever arising whether ways and means cannot be devised to replace the timber monopoly by a healthy farming industry. If the individual, unaided, cannot do it, is it not possible for the State to come to his assistance? An answer to this query is being sought at Denmark. When the Government acquired that estate, together with 28 miles of railway from Torbay, they had to deal with an area that was not wholly virgin country. For many years that concession had supported one of the busiest mills in the State, and had yielded a considerable quantity of timber, principally karri. There had been, indeed, a magnificent forest of that hardwood, and each acre gave a big return of high-class timber. When about four years ago the concession "cut out" and the mills were closed down, not only had all the marketable timber been removed, but a considerable proportion of the remaining trees had been ringbarked. Thus, on the areas cut over, the heavier timber was to a large extent dead, and those portions might have been listed as partially cleared. But in that district nature is particularly fecund, and vegetation stubbornly tenacious of life. One tree is no sooner killed than a young sucker has risen in its place, and there is a continuous natural system of reafforestation. So, though ringbarking had been done and though the commercially valuable trees had been milled, one acre was always reclothing itself with vegetation while its neighbour was being unclothed, and the result was that all the time the estate was being worked by the timber-getters portions of it were retrogressing to their primitive state. Besides, though the good timber had been cut the land was covered by enormous stumps, the removal of which is a problem for combined power and ingenuity. Indeed, in one respect the improvement of the area was only the means of its deterioration. The burning of the dead stumps was more difficult than the burning of the dead trees, and the killing of the large timber, which had been drawing the moisture and nourishment from the soil, was merely clearing the way for accelerated growth of weeds, ferns, suckers, and other forms of undergrowth which had no longer to compete with stronger rivals for the means of subsistence. The country was soon densely overgrown again, and acres upon acres became occupied by almost impenetrable thickets. Then again, some three years elapsed

between the cessation of timber-getting and the sale of the property to the Government, and in that period the undergrowth made remarkable headway and the estate went rapidly backward.

It was such a degenerate property that the Government had to deal with when they acquired the concession for the purposes of closer settlement and intense culture. They were bound to realise that rich though the land was its heavy timber, and even its very fertility were such as to make its success doubtful if it was thrown open for selection in the ordinary way. For not only would the cost of clearing be great but unless the settler was given a fair handicap, the chances were that the native vegetation would be for ever getting the better of him, and that must have been followed by disheartenment and ultimate failure. As survey before selection had been a success, so also, it was thought, partial improvement before selection might also be conducive to settlement, helpful to the settler, and accelerative of production. Upon that reasoning, the Government withheld the estate from selection, and embarked upon a comprehensive policy of improvement and subdivision. It was thought that it would be better, to give the estate a fair start, to provide it with roads and bridges, to ringbark the timber, and burn off as much as would yield to the flames, and then to debit the expenditure to the capital cost of the estate would be adding only slightly to the price per acre, and also would be the most effective way of lending money to the settler. Because, naturally, the State, working on a large scale, could do the heavy work more cheaply than the individual operating in a small way, and the extra purchase money which he would have to pay would be giving him better value than if the same amount had been borrowed from the Agricultural Bank and employed by him independently. That scheme has been in progress since March of last year, under the direction of Mr. Noel Brazier, and a considerable amount of work has been done. Criticism led to the Minister for Agriculture (Hon. Jas. Mitchell), accompanied by the Director of Agriculture (Professor Lowrie) and the manager of the Agricultural Bank (Mr. W. Paterson), making a visit of inspection to the estate. There they found much to please them, and everything to reassure them of the future of the Denmark district.

The estate was acquired by the Government at a cost of £50,000, that purchase money giving the State 28 miles of light railway from Denmark to Torbay Junction, 25,000 acres of land, and the whole of the buildings and improvements in the town, which at one time had a strenuous population of about 900 people. To-day the town is not dead, but rather in a state of suspended animation. The houses, the three churches, the public hall, the institute, stores, hotel, workshops, mill—all remain just as they were when suddenly the timber cut out and the whole populace migrated bodily to another centre. A few houses are occupied, some by permanent settlers in the district, some by the Government officers employed on the estate. When the unemployed problem was acute a couple of hundred men were given relief on clearing work on the estate, and for a time the town was something like its former self. Now the gangs at work in the bush comprise not more than 24 men. There are some 150 settlers within a three-mile radius, and it is mostly because of them that the town still boasts a full-time school, attended by nearly 40 children. This is, however, but a passing phase. Denmark is to be resuscitated, and enter upon a new career. The butter factory may perhaps replace the mill, stock and fruit trees grow where now stand the mutilated trunks of the lordly karris, and green meadow lands instead of scrub thickets domin-

ate the landscape. Conquest will be by the plough, rather than the axe, and a pastorate will be the song of the district's renaissance.

CLEARING IN ADVANCE OF SETTLEMENT.

The precise lines upon which the agricultural future of the Denmark district will be directed has yet to be determined, and much will depend upon the effect which the clearing of the land will have upon the character and moisture of the soil. In its natural condition the concession is a remarkably fertile area of undulating karri country. The hills are not steep, but they are numerous, the formation being like a sea of huge round waves. Very little flat country is found on the estate, and what there is of it is not all of the best. Karri is the predominating timber, some of the trees growing to enormous dimensions, and judging by the hundreds of massive butts on each ridge, the forest must have been magnificent before the invasion by the timber-getter. There are also small quantities of jarrah of a stunted type, redgum, swamp banksia, and sheoak; and the undergrowth includes blackboy, bracken, peppermint, and several varieties of scrub. In parts the vegetation is so thick and rank as to form a veritable jungle, the tall brushwood, reinforced by the trunks of the large trees, forming a solid wall of vegetation, through which a passage has to be hewn. Where the forest has not been denuded of its high-soaring monarchs, the bush is truly delightful. Everywhere is sylvan green, one shade merging beautifully into another, overhead the foliage forms a canopy, and one standing on the topmost boughs might almost attempt to step into the heavens. Bird life and animal life are rare, and except for the occasional screech of a few parrots, the environment is one of sublime restfulness and peace.

For the most part the soil is a light chocolate loam, but here and there on the estate are small patches of granite, sand plain and gravel, the aggregate of bad country being, however, inconsiderable. The loamy soil runs to any depth—some of the uprooted stumps show it to a depth of four and five feet, with a clay subsoil—and it appears to retain the moisture well, perhaps it should be said too well. On all parts of the estate there is abundance of water, small streams running in all directions, fed by springs and swamps that are found very frequently. It may be expected that with the killing of the heavier vegetation the quantity of available moisture will be increased considerably, and that the future of the estate will not be prejudiced by insufficiency of water. The area is undoubtedly rich and fertile and, when the timber is cleared, will be capable of prolific production. On that point such judges as the Minister for Agriculture, Professor Lowrie, and Mr. William Paterson are agreed, and they are able to point to the luxuriant growth of grasses, thistles, ferns, and other forms of light vegetation that have come into being since clearing commenced as evidence in support of their belief.

Already much has been done. In the first place the estate has been opened up. It was pierced and traversed in many directions by the light timber railways of the former owners, and these for ordinary exploratory purposes from passable roads to various parts of the property. In all there are about 70 miles of this track, with culverts and cuttings. Such a road is not, however, deemed sufficient for the purposes of the settler, and the Government have accordingly gone in extensively for road-making. The railway tracks have been widened and levelled where necessary, some length of entirely

new road has been made, culverts have been built or repaired, and several very substantial bridges have been constructed. There is now an extent of from 20 to 25 miles of well-formed roads such as can be used by any class of farm vehicle. So that already one of the first essentials to settlement—convenient means of ingress and egress—has been largely provided, and more work of a similar nature is being done. Then, the Government have set about the wholesale killing of the timber. The intact trees have been ringbarked, the scrub has been cut away, the saplings and other small timber have been felled, and then the fire has been put through the whole of the area thus prepared. In this way about 4,100 acres, in several separate patches, have been treated, and in almost every instance with a fair measure of success. After the burning, men have been engaged in the collection, heaping, and burning of the smaller timber on the ground, and there are still about 10 men engaged on that task at the present time. Simultaneously a party of surveyors have been at work on the classification of the country and its subdivision into blocks of about 100 acres each. Nearly the whole of the 4,000 acres partially cleared has been surveyed and got ready for the selector—that is, ready if the original intention of the Government only partially to clear the area be strictly adhered to. It is possible, however, that it may be thought advisable to do more than that.

The results of the work done were closely scrutinised by Mr. Mitchell, Prof. Lowrie, and Mr. Paterson, and they were quite agreed that good work had been accomplished economically. In some areas the burning has been particularly successful, and the country looks more inviting than ever before. Cleared of all undergrowth the soil is clearly exposed to view, and both its quality and depth can be proved by handling. It was thought by Professor Lowrie that at these places the soil looked too light—of a character known as “snuffy”—but it was pointed out that the heavy burning to which the area had been subjected had made the surface abnormally friable, and that in places where the earth had been puddled by the dragging of heavy logs over tracks on the ridges the soil was firm and more cohesive. Looking at such soil in its comparative barrenness and having regard to the confident opinion of the expert visitors that it would grow grass, fruit, and, where arable, potatoes, onions, and other root crops, it was easy for the imagination to picture those slopes under a carpet of succulent grass upon or under profitable cultivation. There are other portions where the burning has not been so successful and where, consequently, a great deal of further work will have to be done next year. And, of course, too, there is a vast extent of the country practically untouched.

The intention of the Department was that as soon as the burning was completed, while the potash from the ashes was still plentiful on the ground and before the winter rains set in, the reclaimed area should be surface sown with grass seed. There seems to have been, however, some undue delay in obtaining the seed ordered from the Eastern States. That the settler should be allowed on to the estate as soon as possible was the unanimous opinion of both residents and visitors. Mr. Mitchell's conviction is that the land should be at once made available to the settler, but he is not quite certain that what has so far been done by the Government is all that should be done, partially cleared lands heavily encumbered with huge charred trunks laying prostrate on the ground, and with dead trees, some of which are half-burnt, being, if left standing, a continual menace to stock as well as the settlers. The clearing done so far has cost 28s. per acre, including scrub-cutting, ring-barking, and

supervision. To completely clear it would cost, say, another £4 per acre, although the clearing of a small heavily timbered area near the townsite cost £12 per acre. In view of the success attending the Departmental efforts to date the Minister is inclined to believe that the policy of preliminary improvement is not complete enough, and that it would be more economical and effective for the Government to continue their work and completely clear, say, 10 acres in each 100-acre block. Thus the settler would almost immediately be in a position to get a return from his land to support him while engaged in the conquest of the other 90 acres. That need not mean that selection should be deferred till the 10 acres had been cleared; rather the selector should be allowed on the land at once, and while the Government were preparing the 10 acres for him he could be working on other portions of his allotment. Professor Lowrie suggested the dynamiting of the standing trees and the employment of some strong haulage power to drag the fallen timber together for firing purposes, and to prevent it from restricting the growth of grass. The cost of this work added to the purchase price of the land would be cheaper in the long run to the selector than the borrowing of money from the Agricultural Bank in order to do the clearing himself. Indeed, the Director of Agriculture believes that the policy for the whole of the heavily-timbered areas of the South-West should be clearing on a wholesale scale by the Government with the aid of mechanical power which will remove the trees bodily. There is a further merit in this proposal, in that experience shows that the karri and red gum, at any rate, burn more readily when in a fairly green state.

Another question that came under notice of the visitors was whether it would be practicable for the average man, without a fair amount of capital, thoroughly to handle 100 acres of that land. It must be some years before any holding can be completely subjugated, and in the interval the settler may possibly have his hands full in trying to utilise some portion of his holding while at the same time keeping control of the remainder in the face of fast-growing scrub. And that consideration suggests another—whether it would not be wise to settle the land under a special contract, so that in the event of a settler being neglectful and allowing his area to slide back into the power of the forest the Government may call upon their security.

In considering the future utility of the Denmark Estate regard must be had to the diverse opinions which have been expressed in regard to the grassing capabilities of the country. The Department's proposal to sow grass has been received with some amount of scepticism in regard to the ability of grass to hold its own against the scrub and weeds. That the country will grow grass is granted, and Professor Lowrie believes that cocksfoot will be found a particularly successful variety. But what is urged by some men of practical experience is that stock will eat the young ferns and weeds only when they are accompanied by grass, and that, whilst the ferns and other local growths will be thus kept in check during the winter, in the comparative dryness of the summer the grass will be less plentiful, and the ferns and weeds, being deeper-rooted, will be able to make rapid headway unchecked by the stock. There are other opinions, however, which are much more optimistic, and amongst them are the opinions of Messrs. Lowrie and Paterson. They believe, and Mr. Mitchell is with them, that the estate can be made a large producer. In the neighbouring farms, those, for instance, of Messrs. Hortin Bros. and Mr. Knapp, there is evidence of the success with which root crops can be grown. The Denmark area has a fair quantity of ideal apple country.

and the growing of this fruit would be encouraged by the fact that two years ago Mr. Rutherford obtained a remarkable success in London with locally grown Cleopatras. And in addition there is the conviction that the area will carry grass sufficient to allow of dairy herds being kept with profit to the owners. The fear has been expressed that in the winter time the ground will be extremely wet and "spewy," but it may be that successful grassing and working will materially improve the nature of the soil. Be that as it may, there is already evidence of a big demand for the land, and also that there will be strong competition for the town lots. Much is expected from Denmark, and those in authority are optimistic. Because of the several interesting experiments connected with it, the future of the property will be watched with interest.

LONG-LIVED PARASITES.

(L. J. NEWMAN, Assistant Entomologist.)

The following interesting information from the field notes of Mr. J. W. Jeffrey, State Commissioner of Horticulture, was published in the *Los Angeles Times*, California, of August 16, 1908:—

"Fourteen months ago E. K. Carnes, the Superintendent of the State Insectary, placed many thousand codlin moth cocoons in cold storage in San Francisco. They had been previously parasitized by the *Caliephialtes messer*, the insect Compere sent over from Spain with the hope that it would subdue the moth. As there was no place at that time to keep these parasitized worms, they were left in cold storage till the new insectary was finished, and then sent to that institution in June last, and held for developments. For three weeks nothing came from the 'stung' moths, and the manager began to think the flies had failed altogether to mature. But you should see that bunch of codlin moth at this writing. Hundreds of flies are issuing from the cocoons, and the females are busy every day in an egg-laying contest in the bodies of a new lot of apple worms that have been placed in the cages with the flies.

"It seems to me these facts are most astonishing. Here is an insect of only a few weeks' span of life, kept over fifty-two weeks in a state of suspended animation, now emerging and attacking the business of its life with as much strength and zest as if it had gone on in its regular course. They are of extreme interest to entomologists, and perhaps equally so to the public. How far this suspension could be continued at the temperature of about 40, no one knows, but of course there is a point of time at which the vitality would become exhausted. These facts may be brought to valuable application, and as the facilities for insect-breeding have been so largely increased by the State, an attempt will be made to utilise the possibilities of the indefinite extension of the life of some beneficial insects."

DEVELOPMENT OF DRY LAND FARMING.

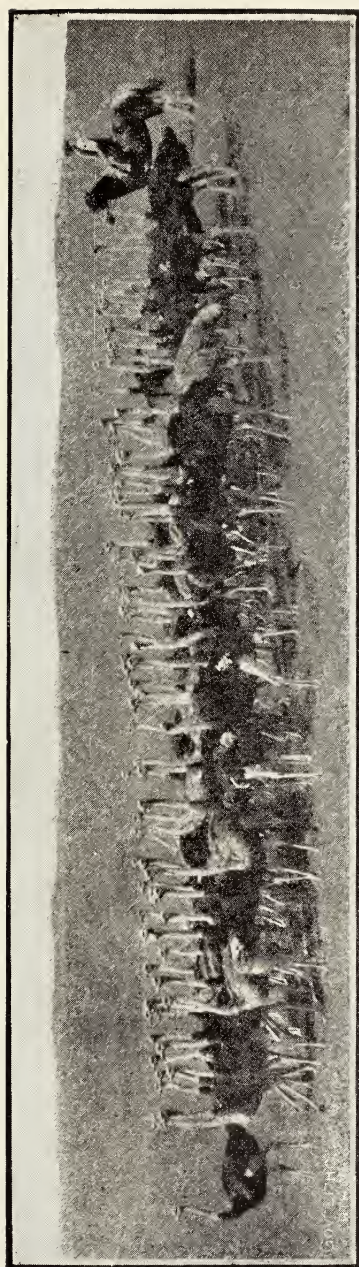
By E. A. BURNETT, Director of the Nebraska Agricultural Experiment Station, Lincoln, Nebraska.

The development of agriculture in the semi-arid regions of the Great Plains area is a question of national importance. It involves the settlement of a large area of fertile land, awaiting only the conservation of moisture sufficient to ensure the growth of crops or the selection of varieties which can maintain themselves under conditions which are often favourable, but sometimes extremely unfavourable, to crop production. The conservation of moisture in the soil by tillage to make up for the lack of rainfall during the growing period, the selection of early-maturing and of drought-resistant crops, and the practice of crop rotation to maintain fertility and the proper physical conditions of the soil seem to me the great problems which must be worked out in order that crop production may be extended into the region which has hitherto been occupied largely for grazing purposes.

Moisture is the great problem. Much of this area receives sufficient rainfall each year to grow an abundant crop, provided all this water could be trapped where it falls and be used by the crop. The great problem is to trap the water, to absorb the rain as it falls and prevent its running off, to impound the water in the subsoil reservoir and reserve it for the use of the crop when it may be needed for the purpose.

In this region of scant rainfall the distribution of water is particularly uncertain, a large proportion of the precipitation falling as local showers, which may come at opportune times over a small area, but leave many sections of the country—in fact, the greater part—to depend for the success of the crop upon water which has fallen at some earlier date. Unless it is possible through the conservation of moisture in the soil to grow certain grain crops practically without precipitation during a period of their growth, grain production in this region will necessarily be uncertain and hazardous. Not only is the precipitation uncertain in this region, but it often falls greatly in excess of the amount needed for immediate use, in the form of violent local storms which are so clean-cut in their outline that one farm may receive an excess of water while the adjoining land is left dry and thirsting for rain. Grass land, where closely pastured, loses much of the rainfall by run-off and evaporation. Land which is ploughed and cultivated to keep the surface loose furnishes ideal conditions for the absorption of rain and also furnishes the best condition to prevent the escape of the water which has entered the soil.

It is unnecessary for me to discuss the method of conservation of soil moisture before this body. We recognise the fact that soil moisture can be stored by cultivation sufficiently to ensure a crop the following year where crop production would be hazardous or impossible without this previous preparation. The extent to which moisture can be stored, the extent and kind of cultivation necessary, and the minimum rainfall under which crop production is possible, I leave for others to discuss. These questions still need more accurate and extensive investigation. Many thousand acres of



OSTRICH FARMING—Mob of young birds.



land which will not grow a crop every year are now being farmed by this method. Where rainfall is nearly sufficient to produce a crop the summer fallow is not needed every alternate year. Possibly only a short period of tillage previous to the sowing of the crop is necessary, but it is essential that an abundance of moisture should be present, especially in the subsoil. We must not be deceived into the idea that it will always rain just at the right time. This is exactly the thing which does not happen. Enough water should be stored in the soil to make the crop sure. If rainfall is abundant you will still produce a crop. I believe the conservation of soil moisture to be the most important question in farming in the semi-arid country.

Summer tillage does more than to store moisture. It encourages the accumulation of nitrates in the soil. It puts the land in the proper physical condition for the growth of the crop, so that at the time the crop is planted all the conditions are favourable for its immediate germination and growth.

The problem of preventing the blowing of the soil under this intensive method of cultivation is serious. The high evaporation of moisture from the soil in the western country is due largely to the high velocity of the wind. The cultivation necessary to store moisture and produce the perfect tilth required for the best growth of the crop favours both the blowing and washing of soils. Rolling lands cannot long be cultivated under such methods without washing badly, and I know of no alternative but to seed these lands down to grass or keep them for a considerable portion of the time in sod. Fortunately, over most of this region, alfalfa can be grown with considerable success—over much of it with very marked success—and, if it is possible to cultivate land in a rotation by which it shall be held in grass for three or four years in a seven- or eight-year rotation, much of the damage which would otherwise result from excessing washing and blowing can probably be overcome.

The selection of the soil will also help materially in preventing its loss by blowing. We have not yet reached the period when all the land in this western area must be cultivated. In fact, it is probable that only a small percentage of this land should be under plough, and that only gradually should we try to reclaim for the use of the grain farmer the country which has proven successful as cattle range. The hard, level lands may be used for cultivation, while the rougher and sandier portions of the country can be maintained as range. In this way we shall minimise or overcome the losses from blowing and soil washing.

The planting of trees, especially for wind-breaks, should not go without mention in this connection, as nothing will so permanently check the force of the wind as the growth of timber; but the production of forests requires a generation. The influence of wind-breaks on the velocity of the wind is but local, affecting the land for only a short distance away from the wind-break. Agriculture on a large scale must depend upon some other method of preventing the loss of soil than by foresting this great area of land which we seek to put under the plough.

The selection of varieties of crops suited to the dry region is also of prime importance in connection with this question. Certain principles should be worked out which apply to the general crops to be grown in this region. In this connection two important factors should be considered: (1) The selection of crops which can be grown and matured before the period of ordinary summer drought, and (2) the selection of those crops which can with-

stand a period of drought and continue their growth when sufficient moisture is later available.

In this connection it occurs to me that throughout a large portion of the Great Plains area winter wheat should be looked upon as a standard crop, and an effort should be made to determine the limits under which it may be successfully grown. It is true that the time when drought conditions will prevail cannot be determined to a certainty. Winter drought is a common form. While spring rains are generally abundant, they are sometimes lacking until late spring or early summer. On the whole, however, I believe that winter wheat may be grown with little danger of winterkilling or of early spring drought if sufficient attention is given to tillage and the conservation of moisture previous to sowing the crop. Winter wheat possesses a decided advantage over the spring varieties—even over the durum wheats—which have been grown in Nebraska. It ripens considerably earlier and out-yields the spring varieties. It is not greatly injured by early spring droughts when sown upon summer-tilled land. Under the conditions prevailing in Nebraska it has been possible to secure a good stand of winter wheat in the fall when lands not under summer tillage were too dry to germinate grain. In this connection it may be interesting to state that light seeding—from one-half bushel to one bushel per acre—has yielded as well as heavier seedings. There seems to be little difference in the thickness of the grain at ripening time between plants which had received one-half bushel of seed per acre and those which had received one bushel or more. This would indicate that in the ordinary heavy seeding only a portion of the grain ever occupies the ground, and that thick seeding at most does nothing more than prevent the tillering of the grain. It is presupposed in cases where light seeding is followed that the weeds have been killed so that they will not come on and occupy the ground before the grain has developed sufficiently to prevent the growth. The yields of winter wheat at the substation at North Platte in the year 1906 were as follows: —

Turkish Red wheat, sown at the rate of $1\frac{1}{4}$ bushels per acre, yielded 42.13 bushels.

Turkish Red wheat, sown at the rate of 1 bushel per acre, yielded 44 bushels.

Turkish Red wheat, sown at the rate of $\frac{1}{2}$ bushel per acre, yielded 42.3 bushels.

Kharkof wheat, sown at the rate of $1\frac{1}{4}$ bushels per acre, yielded 45.7 bushels.

The crop of winter wheat for 1907 at the North Platte substation promises to be as good as that harvested the previous year.

The durum wheats are now commonly grown throughout western Nebraska, and with quite satisfactory results. The area is annually extending into regions where wheat has not before been produced as a profitable crop. I am still of the opinion, however, that winter wheat will be more profitable than the durum wheat under the best methods of tillage, and that by this process the line of winter-wheat production can be pushed far into the dry country.

In the local tests of oats at the Nebraska substation, the early-ripening varieties have uniformly produced the largest and most satisfactory yields, later varieties being injured by drought and rust. Among these early and

successful varieties may be mentioned the Kherson, the Sixty-Day, and the Texas Red.

Our ordinary local barley has proved superior to any of the introduced varieties, and furnishes a large quantity of grain for local consumption.

While corn is a somewhat uncertain crop in the dry region, it is also one of the most adaptable to local conditions, and there is no question about the ability of the station worker to develop varieties of corn which will be suited to the localities in which they are grown. The question as to what extent the corn crop may prepare the land for a subsequent small-grain crop should be carefully studied. I am uncertain as to the degree of drought resistance which can be produced in the corn plant, but cultivation will largely overcome the effect of drought by accumulating moisture in the soil for the use of the plant during the latter part of its growing period.

It is probable that the Kafir corns will always be more drought-resistant than the Indian corn and that they will be used for grain production in the southern portion of the Great Plains area.

If it can be demonstrated that properly selected crops can grow and mature with certainty in the dry region, producing a ton of dry matter, either grain or forage, with smaller amounts of water than our ordinary crops, this will be one of the most successful methods of pushing settlement into the semi-arid region. The durum wheats, Kafir corn, and sorghum give some promise along this line. I believe, however, it should be determined whether these so-called drought-resistant crops actually grow and mature with less water, or whether they simply have a greater power of endurance under drought conditions, enabling them to withstand somewhat longer or more severe conditions of drought than tendered varieties of crops.

The river valleys of this area are noted for their production of alfalfa, perhaps the most wonderful forage crop of the region. Either with or without irrigation they furnish a very large amount of forage for the winter maintenance and the fattening of cattle and sheep. Alfalfa has already extended itself in a limited way to the drier lands of this region and has demonstrated its ability to grow under dry conditions when once thoroughly established. We should endeavour to determine the most extreme conditions under which alfalfa can be profitably grown on the high table-lands of the region, as I believe it easily possible to extend the area under alfalfa in a way which shall very greatly increase the stock-carrying capacity of the country. The successful introduction of alfalfa removes the last difficulty in the production of pork and the development of the dairy industry, two extremely profitable lines of farming which have not been much developed in this region. Alfalfa seed production also promises to be an industry which can be made highly profitable on the cheap unirrigated lands where the rainfall reaches from 10 to 20 inches per annum.

The region under consideration has developed into a great stock-growing country. The conditions of past years have very largely driven the grain grower out and allowed the cattleman and sheepman to remain. The stockman has remained because he has been able to adapt his industry to the natural conditions of the country. He has gathered what nature has produced. He has not, as a rule, expended money upon the growing of cultivated crops. His industry has been reasonably sure, but it has produced only a small revenue per acre, and has not been conducive to the general settlement of the country.

Still, the fact that the grain grower has been driven from the land by adverse conditions, often more than once from the same region, is an indication to us that the settlement of the semi-arid region with farmers who depend upon grain production should be well considered. Experiment stations should not be used to exploit the country and to bring into these regions men who cannot or will not practise successful methods of grain growing. Intensive methods of tillage require a large expenditure for farm machinery and motive power in order to cultivate a small area of land. The average settler has not the means with which to secure this equipment; neither has he the knowledge which will enable him to put it into successful operation. The settlement of this region will progress much more rapidly and more satisfactorily if the settlers already in the country can be induced to practise somewhat better methods and to determine the success of new varieties and of new methods under farm conditions before an attempt is made to bring settlers into the country whose success is dependent upon conditions which they cannot meet.

It is a mistake to assume that the climate of this region is changing permanently—that the rainfall follows the plough. While it is true that the conservation of moisture leaves more available for the crop, we have had wet years and dry years, lean years and fat years, in this region since the records of its settlement are available. The cattleman profits less by the years of abundant rainfall than the man who is growing grain. He also suffers less during the periods of drought. Having invested little in labour, seed, and farm machinery, he risks little in times of adverse conditions. His grass cures upon the ground, and he winters his cattle upon the range with limited amounts of forage which he has stored for their protection during adverse weather conditions.

But people are not content to let the cattleman occupy this region unmolested. The pressure for settlement from outside regions is continuous. The high-priced land of the rich arable country are driving the poor man to the region of cheaper lands. It is the province of the stations in this region to determine how this settler who has already occupied the land may succeed, how he may protect himself so as not to be driven out when adverse years come upon the country, and how he may help to develop this country into one which will support a larger population and give a more certain revenue to its people. The high-priced land of older sections has increased the price of land in the Great Plains area. The cattleman can no longer expect to hold 20 or 25 acres of land for a steer. It must be grown on a much smaller area. This means that the question of forage and possibly of grains for the steer's maintenance must be studied by the cattleman himself or he will be driven from the country by the small farmer and rancher who will give more personal attention to his cattle, producing a small area of crops, but never forgetting that grass is the crop which has built up and developed the region.

The better land will be cultivated first. Probably not over 10 or 20 per cent. of the land between the ninety-ninth and one hundred and fourth meridian should be under the plough. If grasses can be produced which will support more live stock than heretofore, these should gradually be introduced. Forage crops should be grown in as large areas as possible for use in wintering the live stock which is now in the country. The losses of the ranchman from the depletion of his herd in winter through starvation must be

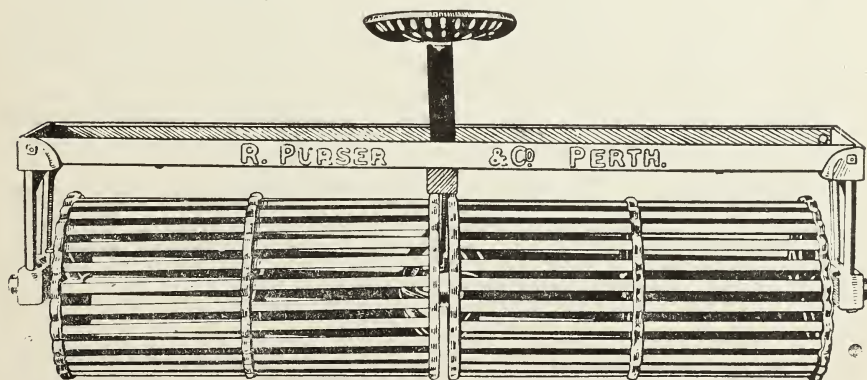
overcome. Good business sense does not permit that a man with 100 head of cattle, weighing 100,000 pounds in the fall, should permit these cattle to come through the winter with a loss of 15,000 pounds of flesh which he must regain by months of summer growth. If the steer must live off a smaller area of land it means he must reach a market weight at an earlier age. This means better feed, more continuous growth, and the use of forage instead of the open range in winter.

The experiment station worker can aid in this matter by determining the methods which will make crop production successful in this area, by determining the varieties of crops which can be produced with greatest certainty and at largest commercial profit, and by suggesting the evolution which must take place in the present farm methods in order that the settler may prosper and that homes may be built in the country upon a substantial basis.

T BAR ROLLER AND PULVERISER.

The use of a good clod crusher or soil pulveriser is of great value to the farmer in increasing his crops. A splendid implement for this purpose is the T Bar Roller and Pulveriser, of which an illustration is here given, and which can be obtained locally from Messrs. R. Purser & Co., of King Street.

It will be seen that the T bars forming the cylinder can be used with either flat or sharp edge outwards. The bars are spaced $1\frac{1}{4}$ inches apart, the effect of this construction is to crush the clods more readily and at the same time leave the surface in small ridges so that the soil absorbs the rain better and the surface does not cake as when a smooth roller is used. The T bar style of construction is a decided improvement, as instead of driving the clods under the surface it pulverises them and leaves the ground in the finest possible condition. On light soils the T bar roller acts as a soil packer and prevents evaporation. The frame which is of angle steel is so constructed that weight may be added if necessary. (2.) Section roller, 7ft. wide, 980lbs. approximately. (3.) Section roller, 1,380lbs., approximately, equipped with pole and neck yoke only.



CARBON BISULPHIDE.

The use of carbon bisulphide as an insecticide is growing in general use. It is of great value in dealing with white ants. Its application as an insecticide lies in:—

- (1.) Its volatile diffusive nature.
- (2.) The poisonous effect of the fumes on all animal life.
- (3.) The weight of the fumes causing them to penetrate downwards.

For Grains and Seeds.

The use of Carbon Bisulphide for treating insect-infested grains and seeds is very extensive; particularly because its use need have no effect upon their germination.

Some time since, fifty-four varieties of seed were treated as a test in the Department of Agriculture at Washington, U.S.A. "Every precaution was taken to ensure uniformity in the seeds of each lot, treated and untreated. The treated lots were exposed to an atmosphere saturated with Carbon Bisulphide fumes for 48 hours. Under the most severe treatment, the severity of which would never be equalled in ordinary practice, a majority of the varieties showed no injury, and germination was practically the same in each lot. Seeds of the grass family seemed more tender than other kinds. Experiments were also conducted upon grain in bulk, using the liquid at the rate of 1lb. to 100 bushels of grain. The exposure lasted 24 hours, and at the end of this period no injury of any kind could be detected in even the most delicate seeds."

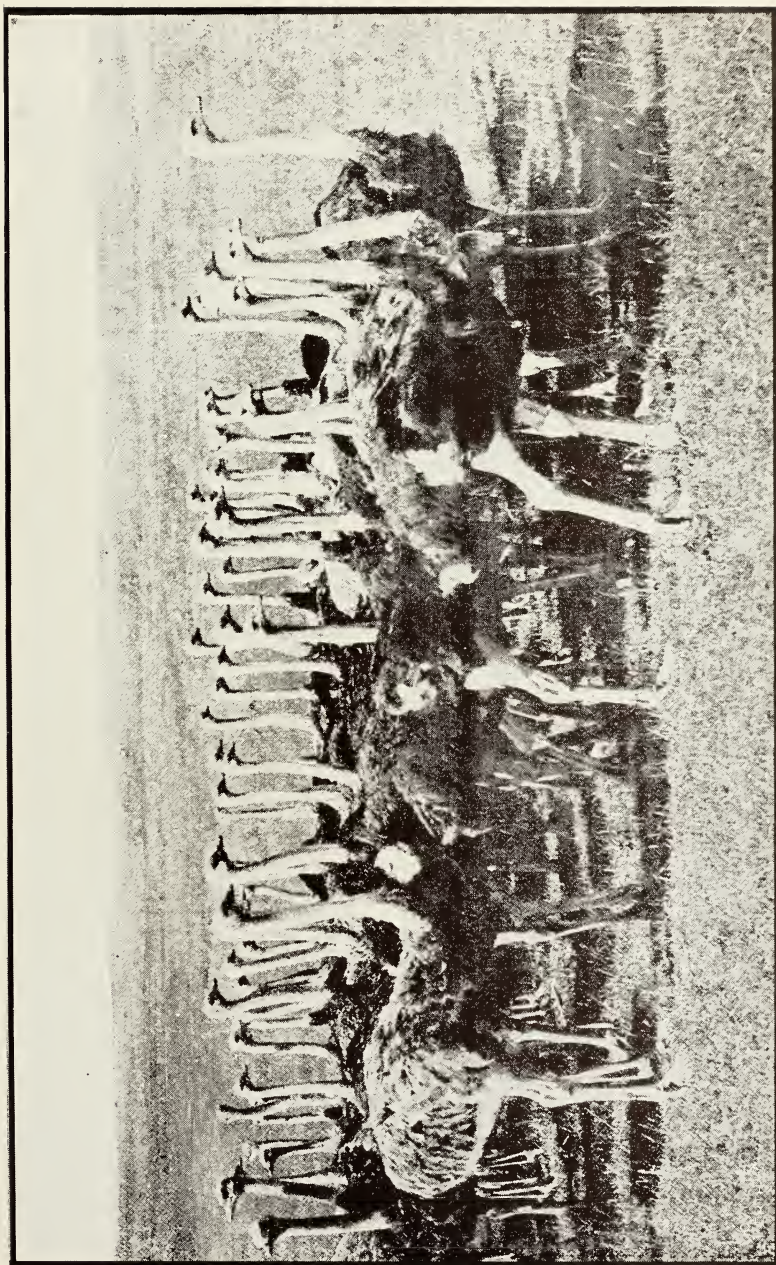
The seeds to be treated should be in tight bins, barrels, or boxes, which have tight-fitting lids or can otherwise be well covered. Seed in bulk stored in rooms can also be treated, but the rooms must first be made fairly gas-tight, the success of the fumigation depending, of course, upon how long the gas can be retained in the room. Stacks of grain can be fumigated if covered with a good tarpaulin. It requires very little ingenuity to make many receptacles and rooms sufficiently tight for the purpose of fumigation and stout paper will be found to be quite efficient in covering cracks and openings through which the gas might escape.

In applying the chemical it is either poured over the seeds or on to cotton waste, which is then placed on top so that the escaping fumes may sink downwards. A very common practice is to put the necessary amount of liquid in a shallow dish or in saucers, and from which it is allowed to evaporate. From 1 to 1½ lbs. of Carbon Bisulphide is sufficient for 100 bushels of grain or for 1,000 cubic feet of air space; that is, is sufficient for a room, bin, or tank measuring 10 x 10 x 10 feet.

Whole buildings are sometimes treated with this chemical, and it would appear that much work in this direction is done in America, in the treatment of flour moth, weevil, etc. In treating mealies the Carbon Bisulphide can be safely applied directly on to the grain.

Termites and Ants.

White ants are one of the most serious pests to be met with, and the amount of mischief wrought by them if it could be expressed in pounds,



OSTRICH FARMING—Birds on the move.



shillings, and pence, would amount to a startling sum. They are most difficult pests to deal with once they have started their depredations in the house or amongst the garden plants, shrubbery, and fruit trees. This is due to the fact that in building, the ants are seldom properly cleared out of the ground, and, in laying off land for tree-planting, the same holds good. The mounds and visible queens may be destroyed, but the bulk of the colony, supplied with small supplementary queens, remain below the surface, unnoticed, until some catastrophe supplies evidence of their presence.

The practice of filling up the spaces beneath tiled verandahs, fire places, bathrooms, and kitchens with soil and brick-bats, often intermixed with wood shavings, furnishes very congenial surroundings to white ants; indeed, in most cases of house attack, entrance is gained through these means, and as often as not nests are established therein. In such cases the boring of holes, at intervals of six feet, is suggested, down which 1oz. Carbon Bisulphide may be poured regularly, say once a week, or as often as it is found necessary, until the pests disappear. The holes should, of course, be plugged tightly with cork, and the verandah floor need not necessarily suffer much disfigurement. An alternative in taking up the tile and replacing it after treatment suggests itself, but I do not know but what the first plan is just as desirable, and is certainly more convenient. Such places should always be treated when white ants appear in the walls, for the nest is almost certain to be situated beneath the tiled floors; in this case holes should be bored at intervals parallel with and distant about six inches from the wall. A little Carbon Bisulphide syringed into visible openings would also be advisable. It is almost unnecessary to add that a careful survey should be made of the environments of the house, and all nests discovered should be immediately treated, either with Carbon Bisulphide or, where possible, by the aid of

The Universal White Ant Exterminator.

This contrivance consists of an air-pump connected by a short length of rubber hose to a furnace. By working the pump, a continuous blast of air is driven into the furnace, entering beneath and escaping through a pipe near the top to which is attached a flexible iron hose. A charcoal or cow-dung fire is first started in the furnace, and, by pumping, got thoroughly alight. The powder is then sprinkled over the fire and the lid closed. By continuing the pumping, a very hot cloud of poisonous smoke is driven through the flexible hose. In use, the nose is inserted into a gallery of an ant's nest, and the smoke pumped in.

In the "Universal White Ant Exterminator" we have the most efficient and effective apparatus for destroying white ants in their nests which has yet come under notice.

Two rather unique cases in the use of the pump are worth recording. In the first case, a white ant's nest was discovered beneath the flooring of a farmhouse, and dug out. Later, white ants were noticed working at the mouth of a gallery 80 feet away from the house. Here the fumes were pumped in, and a few minutes later a cloud of smoke issued through the flooring of the room from beneath which the nest had previously been dug out.

In the second instance, honey bees had become a decided nuisance, making their nests between the lining and the roofing of a large verandah.

Anger holes were bored through the ceiling boards and the smoke pumped in through a length of iron piping. The immediate result was to drive the bees out through every exit hole they knew of. Many dropped dead, but the great majority escaped alive. Afterwards, of course, the bees returned and, naturally enough, started to work cleaning away the poisonous deposit, with fatal results; an ironical return for their industry.

Wherever an ant gallery, sufficiently large (about half an inch in diameter) to admit the nose of the hose, can be obtained, the machine can be used with the most satisfactory results; not only are the insects killed, but the galleries are thoroughly poisoned for an indefinite period. All other openings into the nest, which will be revealed by the issuing smoke, should be thoroughly closed, but not until the fumes have been allowed to pour out of them for a minute or two.

THE CEYLON BUREAU, PERTH.

Situated in Emanuel Buildings (Howard Street entrance) is the Ceylon Bureau in Western Australia. This institution, whose primary object is to make Ceylon better known to the people of Australia as a health and holiday resort, has been established just over a year; and some idea of the scope of its work may be gathered from the extracts from the first annual report of the director, Mr. F. J. Wayman, which were published in the Perth newspapers during the second week in March. The energies of the Bureau are also directed to encourage trade between this State and the Colony; and one prominent illustration of what it has been able to accomplish is to be found in the satisfactory start the Western Australian fruit trade with Ceylon has made. This may be described as a valuable commencement in what should be an important business, and one from which fruit-growers will, as the trade expands, reap increased benefits.

The export of flour to Ceylon from this State, also brought about through the instrumentality of the Bureau, shows every indication of a steady and progressive character. The director has completed exhaustive inquiries as to the possibility of Western Australia supplying Ceylon with chilled meat; and if a chilling and refrigerating plant is erected at Wyndham that supply will be furnished, and another valuable addition made to the export trade of the State.

In the matter of coal, colliery proprietors have availed themselves of the Ceylon Bureau with a view to securing for the local product a foothold on the Ceylon market. In making known the advantages of the State as a place of settlement for Anglo-Indians, the Ceylon Bureau has not been inactive; and many inquiries are received at it from prospective settlers. Farmers, producers, merchants, and others are supplied gratis with all information relative to Ceylon at the Bureau, and those who contemplate a trip to the Spice Isle are given beautifully illustrated and well got up descriptive pamphlets.

CORRESPONDENCE.

THE CURCULIO BEETLE.

Mr. E. J. McCarthy, Stock Inspector at Esperance, writes:—

“Your February ‘Journal’ has a paragraph on the Curculio, and Mr. Wicken advises trapping must be resorted to, as spraying proves only a slight check. I recommend any sufferer to try the method successfully adopted by me.

At Payneham, near Adelaide, I, some years ago, uprooted a neglected garden 50 years old. This contained all sorts of pests from the Codlin moth to the Curculio. Replanting partly with orange and lemon trees—trees procured from a near-by nursery and which never showed signs of moving, I was surprised to find in a short time that the topmost leaves became saw-edged and that after having been eaten away the branches were barked always with a downward tendency. Some trees died. I could find nothing either on the tree or in the soil in the day time nor even at night. I then tried the following:—

After dark I surrounded as many trees as possible with white cloths (cheap calico, etc.), without jarring the trees or showing a light. Then directly a light was shown the beetles dropped like shot. I always shook the trees to make certain none were lodged in the forks, but that is unnecessary. Newspapers will serve the purpose, though badly, as they are hard to pick up and again the wind disturbs them. Immediately the beetles fall take up the cloths, shake into a tub and burn the catch as soon as possible. I have tried these beetles in a tightly corked bottle of quicklime for a week without apparent injury to them.

Spraying, I think with Mr. Wicken, is useless; the plan above described is certain. The Curculio is at times dormant and one requires to be watchful even when it appears the pest is beaten, as the unhatched eggs have to be considered. Don't rely upon not finding beetles around the trees as they travel at night and dirty undisturbed hedges prove a great shelter. No other than the citrus tribe were attacked in my case, although orchards (apple) in England suffer.”

BACON-CURING.

Mr. H. D. Smith, of Wannamal, makes the following inquiry:—“In your February issue you give a recipe for bacon-curing pickle by Professor Douglas, in which he mentions that dry antiseptic is used. Will you kindly say in your next issue what is a good antiseptic to use?”

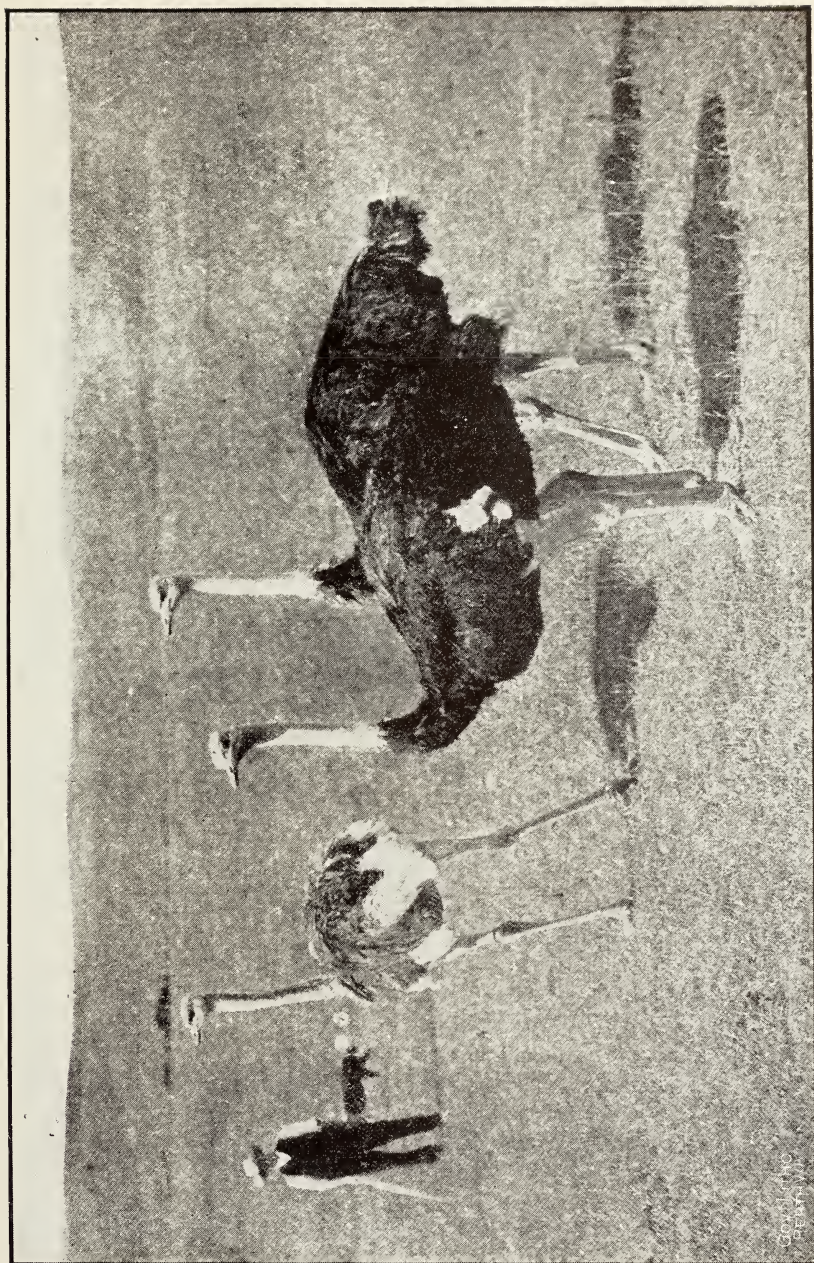
[We should think that boracic acid would be found the best effective antiseptic.—ED. *Journal of Agriculture*.]

OSTRICH FARMING.

In Mr. H. Nathan's article on ostrich farming in March *Journal*, reference was made to the extensive farm at Whitford Park, in Auckland, New Zealand, where there has developed a valuable industry. In this issue we are enabled to reproduce three interesting illustrations from the *New Zealand Town and Country Life*, together with the following particulars of the flocks at Helvetia Ostrich Farm, which comprises 3,500 acres and is run by a company. The ostriches were originally imported from South Africa, and were first located at Whitford Park, thence being taken to Pukekohe. The flock now comprises about 500 birds of all ages, though very few of the original members remain, and with this season's hatchings there should be an appreciable increase. The birds are valuable only from the feather-producing standpoint, their flesh being too coarse for edible purposes, and thus their market value is not easily ascertainable. A bird may bring anything from £2 15s. up to £15 per annum, and one feather may be worth as much as £5 or even more, when cleaned and dressed ready for marketing. Even at the smaller return the birds should pay well, for they give no real trouble, and cost very little for feed. As a matter of fact, hand-feeding is dispensed with, and the birds graze side by side with cattle, horses, and sheep, feeding on the smaller herbage and leaving the longer grass for the other stock. With the thousand-headed kale available as winter feed, they do not even require hand-feeding in winter, and although covered pens are provided for the breeding birds, no stabling or shelter accommodation is necessary for the bulk of the birds. It is a moot question whether they would not do better were shelters provided for them during the colder months of the year, as it is indisputable that the feathers suffer during cold snaps, their beauty being marred by certain contractions caused by the chills to which the birds are subject at such seasons. These show themselves in peculiar crossings of the feather, which spoil the graceful waviness and freedom of the perfect ostrich feather.

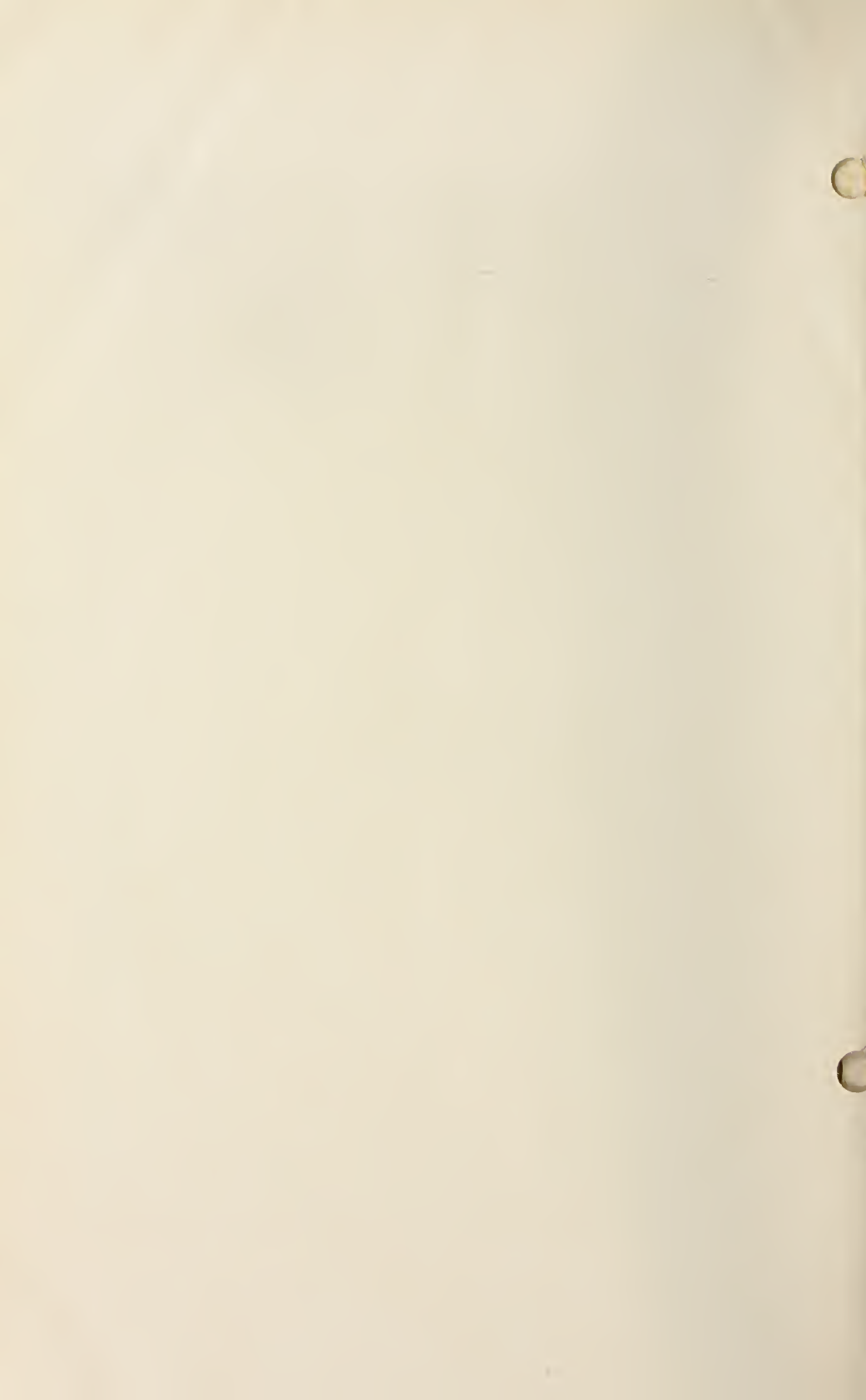
At this season of the year, the birds having been recently plucked, are minus the best of their plumage, but they look well and appear very healthy. A few young ones, hatched out in incubators, have made their appearance, some being only a week old when the farm was visited, while others had completed the first fortnight of their existence. There are three incubators at work in the hatching-room, each carrying 36 eggs, and of these as much as 75 per cent. have been hatched, the period of incubation being 42 days. There are some few cases in which the birds hatch out the eggs themselves, and when they are disposed to do so, they are not interfered with. In such cases both the male and the female birds sit on the eggs, the former taking his place upon them by night, while the latter gives them the warmth of her body by day. The birds are monogamous, and when showing a disposition to mate are placed by themselves in one of the breeding yards, in each of which shelters are erected.

Though naturally wild, and on occasions even dangerous, owing to their fleetness of foot and their powerful legs, which will deliver a blow strong enough to smash a man's arm, ribs, or legs, they are at times very timid in



Ostriches grazing.

GOULD
1894



their movements, and are easily scared by strangers. At the same time they are gifted with an almost insatiable curiosity, and will follow visitors around and peek at their boots and buttons, and will even endeavour to investigate the contents of pockets, etc., if they do not previously destroy the clothing to which the pockets belong. As they can only kick from the front and raise the leg to do so, one can generally escape from them by lying flat on the ground.

Coming back to the incubators it is of interest to note that the machines used are the Cyphers, which experience has proved to be quite the best for this sort of work. A Petaluma machine is used for drying off the chicks, but is unreliable for hatching purposes.

The business of plucking the feathers is apt to prove rather exciting—it would be impossible were the birds not placed under some sort of restraint, hence a plucking box is used, and into this the ostrich is driven and so confined that, while the plucker has perfect freedom of action and can get at any part of the bird, the latter is well under control.

The treatment of the feathers and their preparation for market is an art and a business in itself. A well-appointed factory building with every facility for cleaning, dyeing, bleaching, and dressing the feathers is located on the farm, and here the finished article may also be seen, from the feather boas, the prices of which range as high as fifteen guineas or more, and the graceful plumes which find a ready sale at from £5 to £8 8s. down to the 35s. boas and the lower-priced feathers. More system is being introduced into the business. In sorting the feathers boxes of various sizes are used in the first place into which feathers of a size are placed, the gradations being as low as 1-8th of an inch. The commonest black feathers thus sorted up are made into feather dusters, which sell readily at 4s. each, or at 42s. per dozen. All through the factory order and system reign supreme, and the returns show the business to be an increasingly valuable one.

The Helvetia Ostrich Farm does not carry all its eggs in the one basket. It carries a fine lot of sheep—750 or more—and now that “wool is up,” these are telling their tale, and adding to the prosperity of the place. There are also a number of cattle and horses on the farm, and this season some 100 acres or so are under oats, the crop being as heavy as anything yet seen in the Waikato, or indeed further South.

A SOUTH AFRICAN'S VIEWS.

In the latter part of last year the subject of establishing the ostrich industry in this State on a commercial basis was broached by Mr. J. Farquhar Messer in the following letter, written from Johannesburg:—

“After careful study extending over two years, I am convinced that there is a great future in the States of the Commonwealth if this industry is once taken up, especially if the Importation of Plumage Prohibition Bill is passed in England. The export of feathers for the last year in Cape Colony alone is valued at over £1,500,000.

“I have studied your “Land Open for Selection and Rainfall Belts” and conclude that, as the ostrich wants a warm dry climate, irrigation would be necessary for the cultivation of lucerne. Ostrich farming other than on lucerne is not very profitable as land would only carry about one bird to 25 acres, but on lucerne *three* birds to one acre is a fair average, also the feather of lucerne-fed birds is improved by over 100 per cent., and

they are tamer and more easily handled. The plucking of an average lucerne-fed bird is valued at £10 per annum and those run "wild" at £3.

"Referring to your rainfall belts and with the personal knowledge I possess of the South-Western districts, I am of the opinion that the country round Broomehill would be the best to start on. In the event of not being able to obtain land in the above district suitable for ostrich farming, or like land in any other districts that have been thrown open for selection, would your Government be prepared to grant me land on special terms under the Land Act of 1898?

"As to obtaining birds, I presume I could make arrangements with the curator of the Zoo to allow me to have the eggs to incubate, otherwise I should have to secure them from the principal of the Hawkesbury Agricultural College, with whom I am at present corresponding. I may mention here that it is quite out of the question making any effort to obtain either eggs or birds in South Africa owing to the strict enforcement of Act No. 30 of 1907 of Transvaal which forbids exportation of either eggs or birds under a penalty of from one to two years hard labour without option of fine. The same penalty prevails in the other South African Colonies.

"The requirements necessary to start ostrich farming in your State would be:—

- (1.) Two hundred acres, say 25 of which could be put under lucerne gradually as birds are hatched out.
- (2.) Land to be capable of irrigation.
- (3.) Land to be in a dry warm climate with a rainfall of from 20 to 30 inches. If supply to irrigate is plentiful, country with rainfall as low as 10 inches would be suitable.
- (4.) Eggs obtainable from the Zoo, if possible.
- (5.) Liberal assistance from the Government.

I enclose for your perusal and return an article on Ostrich Farming in Cape Colony by one of the leading farmers.

Should your Department wish for further information *re* the industry, I shall have much pleasure in forwarding same."

PUBLICATIONS RECEIVED.

— — —

Statistics of New Zealand, 1907.

Forest Flora of New South Wales (Maiden), Vol. IV., Part 3.

First Report—South African Central Locust Bureau.

Book of Market Gardening (R. Lewis Castle).

New Zealand Flock Book—Romney Marsh—1908.

Practical Designs of Irrigation Works (Bligh).

Trade—Milk and its Treatment (C. Budde, D. Sc., Copenhagen).

NATIVE FODDER PLANTS.

(*Opercularia vaginata*. Labill.)

(Report by Mr. H. ST. BARBE MORE, Inspector of Lands, York.)

In reports which I have submitted from time to time on the indigenous fodder-plants of my district, I have mentioned two which I think are worth the attention of the Agricultural Department—*Opercularia vaginata*, and *Sieberta juncea*. My study of the subject has been prompted throughout by a desire to find ingredients for a mixture for a native permanent pasture. It seems to me sound reasoning to suppose that an indigenous perennial, which thrives in ground which nothing has ever penetrated to promote fertility but the scratching and burrowing fauna of the bush, will make a better show if bred under cultivation. This may be an erroneous assumption to start off with; if it is, then my investigations may have been in vain.

Trials with introduced grasses which I have watched here have so far been inconclusive, but not universally discouraging. Whatever disappointment there has been has, to some extent, been due to infertility caused by imperfect preparation of the bed, as well as, perhaps more than to the dry summer months to which checks have always been attributed. Ultimately, foreign species may triumph over indigenous ones. Meanwhile, I think that it may be profitable to look through our own stock-in-trade. Our unimproved, or only ringbarked lands, yield us a natural sward which is now the sole support of many a fine flock. Our stubbles and stubble-leas are better still. Yet, not a handful of seed have we scattered on them, except cereals, and scarcely an act of tillage for those have we performed worthy of the name. We are pushing on through the heat and smoke of burning forests to the bracing, clear ether of agriculture unhampered by development, and who that now rides where the uprooting mattock is driven into rich friable virgin loams can take as the summits of accomplishment our little attempts by the way to grow wheat or increase carrying capacity?

For want of time and space, I can only deal now with *Opercularia vaginata* (N. O. Rubiaceæ), vulgar name "jointed weed." In my examination of it I have had a scholar-like and keen associate in a neighbour, Mr. Oswald H. Sargent, a well-known botanist and chemist. Mr. Sargent has both analysed and photographed it, and thus enable me to supplement my report with his more valuable contributions which I attach.

From the thirties of last century down to the present day, "jointed weed" has been looked upon in the Eastern districts as a rare stock-feed. Not many years have elapsed since sheep were herded over this country, dotted about which the famous old feeding-grounds have hardly yet recovered from the shock of the desecrating tramp of the invading close-settlement army. And many an old shepherd and flock owner have I heard extol "jointed-weed." Such a history creates a thirst for more information. My personal acquaintance with it commenced five years ago. What I think of it is evident from my having taken it first in order in my search for an indigenous forage suitable for elevation to a seedsman's catalogue, although there must be numerous

powerful rivals in a varied herbage which has gained such renown for building up plump carcasses and high-priced clips. Parenthetically, "jointed-weed" leaves a black stain on sheeps' mouths. The rainfall in my district ranges from 10 to 25 inches, and the district comprises about 3,000 square miles. I have found "jointed-weed" all over this area, and during a recent ride over some of the Midland Company's lands, adjoining Three Springs, about 250 miles from my nearest boundary, I came across it there. Its distribution is, therefore, very wide. Its adaptability and succulence are equally constant. In soils of almost every grade of texture, richness, and depth it is the same green herb, year in, year out. Nearly every degree of size of soil particles, of porosity, and of conditions as to aeration and moisture seem alike the same to it, and to have no effect upon its edibleness or fattening properties. Thus far it would seem that we have one ideal component for our indigenous mixture. But Mr. Sargent's analysis does not quite continue in the same happy strain. We must bear in mind, however, that "jointed-weed" is of primordial wildness. As Mr. Sargent says, "it would not be fair to judge this plant by comparing my analysis with analyses of plants which have been cultivated and bred for many years." The carbo-hydrates found in the animal body are:—

Grape sugar (dextrose) $C_6H_{12}O_6$
 Milk sugar (lactose) $C_{12}H_{22}O_{11} + H_2O$
 Inosit $C_6H_{12}O_6 + 2H_2O$
 Glycogen $C_6H_{10}O_5$

while the formula for Cellulose is $C_{12}H_{20}O_{10}$. Precisely why the latter compound is, to again quote Mr. Sargent, "not of first-class food-value," is not stated in Mr. Sargent's writings.

But I am not a whit disheartened. Were "jointed-weed" accorded a place among the plots of our own State farms, I should have considerable confidence that it would respond to the coaxing of science; and, even if it did not, results have proved it, in practice, to be sufficiently nutritious, and to be intensely relished by sheep on account of its flavour and juiciness. It will stand feeding right down to the ground. I beg to recommend that this plant be taken in hand departmentally.

Mr. Sargent's Report.

The botanical name of the plant is *Opercularia vaginata* (Labill). It is a member of the natural order *Rubiaceae*, an important order economically, as it contains many useful plants, including notably *Cinchona* (yielding quinine) and *Coffea* (yielding coffee). So far as I have been able to ascertain, there is no fodder-plant of known importance included in the order.

I need not describe *Opercularia vaginata*, as the accompanying photograph gives a good idea of its appearance and average size.

In order to ascertain the fodder value of the plant, I have made a chemical analysis of the parts likely to be eaten by stock. The time at my disposal has not allowed me to make a complete or scrupulously accurate analysis; but my results are sufficiently near the truth for present purposes. I find that the percentage of "flesh formers" is rather low (about 1 per cent. albuminoids); but that of "fatteners" is fairly high (12 per cent. digestible carbohydrates and one-half per cent. fats). Against this must be set the fact that the carbohydrates consist chiefly of cellulose, which is not of first-class



Native Fodder plant.

food value. The percentages are reckoned on fresh (not dried) material, which contains 79 per cent. moisture.

Upon the whole my analysis points to the conclusion that the plant is fairly good fattening fodder. It would not be fair to judge this plant by comparing my analysis with analyses of plants which have been cultivated and bred for many years. (I may remark it compares unfavourably with lucerne.) It seems to me worthy of serious consideration, especially as it grows well in dry and barren-looking situations.

I collected and sowed a little seed early in December last, but it has not yet germinated. Possibly it would germinate more rapidly in winter. The plant grows from a subterranean root-stock, and appears to be long-lived.

BULLETINS ISSUED BY THE DEPARTMENT OF AGRICULTURE.

Settler's Guide, 2nd, 3rd, 4th and 5th editions.

Handbook of Horticulture and Viticulture (A. Despeissis). 2s. 6d. and 1s.

New Dairying ("Agricola").

Diseases of Honey Bees (John Sutton).

What can be done by the Beginner on the Soil (Hon. James Mitchell, Minister for Agriculture).

Stack Silos (A. Despeissis).

Report of Proceedings of Conference of Producers, 1907.

Factory Dairying (J. A. Kinsella).

Vegetable Growing (G. Chitty Baker).

Examination of the W.A. Poison Plants (E. A. Mann).

Care and Treatment of Milk and Cream (J. A. Kinsella).

Hints to Stock-breeders (Weir).

Meat Inspection and Diseases of Animals (J. B. Cleland, M.D.).

Poultry, Care and Management of (F. H. Robertson).

Back volumes *Journal of Agriculture*.

Tobacco Cultivation (H. Allerton Cowper).

Cotton-growing (H. Allerton Cowper).

Dingo Trapping.

The New Sun-Dial (W. E. Cooke).

The Silo on the Farm (J. A. Kinsella).

Conference of Producers, 1908—Report of Proceedings.

Diseases of animals and Meat Inspection (1908) (J. Burton Cleland, M.D., Ch. M., Sydney).

Trypanosomiasis and other diseases of camels (J. Burton Cleland, M.D., Ch. M., Sydney).

Free copies of such publications as have no prices attached can be obtained on application.

FISH GUANO.

(By LOUDON M. DOUGLAS, Lecturer at the College of Agriculture, Edinburgh.)

The enormous quantities of fish which are landed on the shores of the United Kingdom continues to increase year by year and contribute very largely to the food of the people. Fish, in the complete state as taken from the water, are in daily use throughout the country, and the handling and distribution of these make up a gigantic industry, and indirectly give rise to many industries of a subsidiary character which are associated with the fish trade.

A large proportion of the fish caught, however, are not utilised at once, being cured or otherwise treated so as to delay the period within which they must be consumed; hence it becomes necessary to free such fish from offensive or useless portions which would interfere with their proper handling. In such parts as Aberdeen, Fraserburgh, Grimsby, and many others, the residues amount to a huge bulk of material which has either to be utilised by some process of manufacture, destroyed by burning, or taken out to sea.

As a matter of fact large quantities are utilised for industrial purposes and fish "offal" has therefore become an article of considerable value. In addition, however, large quantities of fish are condemned at various markets as being unfit for food, and these are also added to the raw material utilised for manufacturing purposes. This is more especially the case at Billingsgate Market, London, which from its great size is more likely than any of the others to be the dumping-ground for questionable fish from many quarters.

The utilisation of these residues in a scientific way was begun in 1862, by M. Rohart, who commenced the drying of the refuse heads and backbones of Norwegian cod on heated floors, after they had been sun-dried on the rocks. He subsequently ground the material obtained with mill-stones into a fine powder and in this state it was long known to the market as Norwegian Fish Guano.

Subsequently, however, the process of manufacture was improved as it was seen that the demand for fish guano was likely to increase owing to the failure of Peruvian guano supplies. Farmers preferred guano to artificial manures and in the absence of the natural product from Peru they favoured the preparation from fish residues. In this manner the demand for fish guano has increased and at the present day continues greater than ever. To make 1,000 tons of fish guano it has been computed that 7,000,000 cod-heads would be necessary and to obtain these 50,000 tons of fish would need to be caught. Such numbers strike the imagination as being gigantic. They are, however, not extraordinary when the actual facts are examined, as the harvest from the sea is reckoned in millions.

There are two principal kinds of fish guano, namely, that prepared from white fish such as cod and haddock, and the other "herring guano."

prepared from residues from gutting and kippering herrings. But the herring residues contain a large percentage of oil, which is a serious barrier to the making of guano. The oil has first of all to be pressed out before the residues become available, and even then the product is much inferior to the guano prepared from white fish.

There is quite a number of fish guano works in the United Kingdom, and those are distributed pretty well over the whole country. The newest of these has recently been started at Fleetwood, under the style of the Fleetwood Fish Meal Coy., Ltd., and their product is of a very fine quality, and can quite well be used for cattle feeding purposes—feeding mixtures with a certain proportion of fish meal being quite common on the Continent.

The factory at Fleetwood, which was designed and equipped throughout by Messrs. William Douglas & Sons, Ltd., of Putney, London, who have highly specialised the manufacture of the various products derived from fish residues, consists of a large rectangular building, built of light structure and sheeted principally with corrugated iron. The kind of equipment necessary in such a place will be best understood by describing the process carried out.

The fish residues are first of all hoisted to the top floor where they are passed through a "Douglas" Cutter which is so rapid in action that it can get through many tons of material in a day; it is difficult in fact to utilise it to its utmost capacity. This machine speedily reduces the material to a pulp, when it falls by gravitation into a 48in. hydro-extractor in which the excess of water present is removed instantly. When it is considered that the moisture present may amount to 60 per cent. and over, it will be seen how very desirable it is to remove (as can easily be done by a specially constructed hydro-extractor) a considerable portion of this, at least one-half. The subsequent drying benefits to that extent.

When the residue has been partially dried it is then lowered and conveyed to one of the driers of a construction which has been found to answer the purpose well. These driers are 12ft. long and 6½ft. in diameter. In the middle is fixed a rotary spindle to which heavy arms are attached. One end of the spindle or shaft projects, and to this driving gear is attached, so as to rotate the arms slowly. The driers are then jacketed and are capable of drying the semi-dried material into an impalpable powder in from six or seven hours. The quantity they hold is from 30 to 40 cwt. each, and with a little experience it is quite easy to gauge when the process is complete. If too much heat is used the colour and quality of the product will deteriorate.

The most important attachment to a guano or fish-meal drier is that which deals with the vapours. The odours which arise from fish-drying are most offensive, but they can be controlled almost entirely by the application of a forced exhaust produced by a fan and which causes the vapours to pass into a large volume of water where the condensable vapours are absorbed, and the non-condensable vapours are held in suspension and may be run away in the waste water at once.

The time taken in drying has been a constant drawback in connection with these driers, many of which of somewhat similar design have been erected in various parts of the country. The adjustments, however, which

these particular appliances possess enable them to reduce the time taken to a minimum.

The plant will be seen to be very simple as, besides the apparatus mentioned, all that is required is steam and motive power. The mechanical equipment of a modern fish meal or fish guano factory therefore, consists of:—(1.) Steam engine. (2.) Boiler. (3.) “Douglas” Fish Cutter. (4.) Hydro-extractor. (5.) Driers. (6.) Vapour condensers. If this plant can be arranged on three floors so as to take advantage of gravitation, then economy of working is complete, and a perfect product will be the result.

Fish guano is sold on analysis and its value is estimated according to its constituents. The following is an analysis of a fair sample:—

Phosphate of lime	..	..	..	17.28 per cent.
Nitrogen equal to ammonia	..	..	..	10.50 per cent.
Water	..	..	..	18.98 per cent.

The guarantee in this particular case was:—

Phosphate of lime	..	..	..	17.00 per cent.
Ammonia	..	..	..	10.25 per cent.
Water	..	..	..	19.00 per cent.

so that the bulk was well equal to the guarantee. The prices vary considerably, but may be set down as averaging 10s. per unit for ammonia and 9d. per unit for phosphate of lime. On that basis, therefore, the guano in question would be worth about £6 per ton, which represents a very large difference between the raw material, costing 10s. to 15s. per ton according to locality.

The business is indeed a very profitable one when well managed, and there are many ports in the United Kingdom where fish guano factories could be put down with every prospect of converting fish residues, which are at present simply wasted, into a highly remunerative product.

ABORTION OF PLANTS.

(L. J. NEWMAN, Assistant Entomologist.)

This obscure disease has been very prevalent during the summer months, affecting most seriously the *Solanum* family. In some instances the tomato and Cape gooseberry crops have been reduced by 50 to 75 per cent. This complaint is not confined to the *Solanum* family, affecting more or less many kinds of garden plants. The first symptoms appear about the middle of December, when the plants should be setting their mid-season crop, instead of which, the affected plants begin to look sick and produce an abortive growth,



Tomato plant, showing effects of abortion disease.



commonly called "Rosetting"; or else the petals of the flowers are altogether deficient. The plants when cut hard back usually make strong, healthy growth, and eventually bear a late crop. Both Dr. Cleland and myself have made careful examination to try and discover the insects or fungus likely to cause the trouble, but without success. The roots appear to be perfectly healthy and making vigorous growth. In some instances the plants will flower and set their fruit, and then develop the trouble: the fruit becoming hard, woody, and totally unfit for use, as the illustration will show.

The seed from discarded plants should on no account be saved.

So far, no remedies have been discovered, but it is advisable to cut back all plants showing signs of the disease.

WESTERN AUSTRALIAN WHEAT.

EXPERIMENTS IN QUEENSLAND.

The Department of Agriculture in Queensland has been conducting a series of experiments with winter cereals at the State farm at Roma. A report on the various experiments appears in the March number of the *Queensland Agricultural Journal*, from which we extract the following reference to "Alpha" wheat seed obtained from this State. It is, no doubt, well known that "Alpha" has been produced at the Hamel experimental farm under the careful selection and cultivation of Mr. Berthoud, the manager, and it is highly satisfactory to him and to the Department that such good results are recorded in the Eastern State from trials of this valuable variety.

The report states:—

"Alpha.—Sown, 23rd June, 14lbs. to the acre. Earing, September, 4th week. Harvested, December, 2nd week. Yield, 22.8 bushels to acre. To all appearances this season, this wheat, which was introduced from Western Australia, is a very desirable variety to grow. Prior to a storm, which resulted in not much more than half the grain being garnered, it gave promise of giving the heaviest yield of any variety grown. The reason of its falling down was not wholly due to a defect in the plant, but, in a measure, to the fact that the drills were sown 14in. apart, and so the plants afforded each other very little protection or support. It should prove a good hay wheat—fine and stout, in straw, flag very coarse, head compact, well filled, does not shed grain, of pleasing appearance.

"Should this variety come through a rusty year it will be an acquisition to the varieties now in favour. After subsequent field tests the results in this particular will be made known."

THE PEA - NUT.

(*“Arachis hypogaea.”*)

The cultivation of the pea-nut, or ground-nut, is carried on in the United States on a large scale and is very profitable. There are similar possibilities for this popular product in Australia, the methods for its cultivation being of a simple nature.

A very light, preferably sandy soil, is required, which allows the crop ample space to develop towards maturity. Clay soil or heavy damp loam are unsuitable. The ground should be well worked to a depth of 10 inches or one foot, be well exposed to the action of the air for some days, and then thoroughly harrowed. The use of lime as a fertiliser will contribute to successful results.

About 100lbs. of seed will sow one acre. After forming flat ridges from 4ft. to 5ft. in width, leaving narrow furrows between each ridge, the seeds are set in pockets of two or three together along the middle of the ridge. The bottom of the pockets should be manured or fertilised before the seeds are set in them. It is an essential condition for successful germination of the seed and growth of the plants to have the soil in a moist state; therefore sowing should take place in the rainy season.

The plants should be kept free of weeds and when near maturity the ground should be worked up and loosened so that the fruit can bury itself. At that stage of fructification it is necessary that the soil should be in a dry condition. The crop will be mature in from four to six months, the stalks and leaves of the plants withering and turning yellow. Varieties which bear fruit at the base of the main stem (like that shown in the illustration) require much less labour in crop-gathering than those which bear nuts on trailing branches.

A new variety, the White Valencia, grown on an experimental plot at Hamel State farm, showed the cluster of fruit at the roots, and also several loose nuts. Mr. Berthoud considered this to be by far the best variety he has ever tested, the nuts being large, well-filled, of good flavour, and very prolific. The trial plot yielded at the rate of one ton dried nuts per acre. The planting took place in November, 1907, and the crop was harvested last month (June).

The yields of the pea-nut appear to vary, with nature of the soil, climate, and mode of cultivation, from half-a-ton to four tons to the acre. An average crop, with fair amount of attention, should not be less than one ton per acre.

The *Agricultural News*, advocating the cultivation of the ground-nut, urges that the nut is not an exhausting crop, as is generally supposed, since the plant, with its penetrating root, collects much of its food from the layer of earth beneath the surface soil. It is also a greedy collector of nitrogen from the atmosphere, both above and within the soil. The vines



Pea-nut plant.



are therefore of special value as green manure. "Pound for pound, rotted, the vines are fully equal in value as a fertiliser to the best stable manure. Wherever ground nuts are picked off in the field, and the vines and debris are left to decay, the corn or other crop grown upon the spot in the following year will invariably show great improvement."

The pea-nut prefers a rather sandy, loamy soil which should contain enough vegetable matter to make it light and porous, and also to prevent its becoming too dry. Since the trade demands a light-coloured shell, nuts of equal flavour and quality grown on other soils do not find a ready sale; and it may be proper to state at this time that the pea-nut can be grown on a very wide range of soils provided they contain a sufficient amount of lime. This information should encourage many who only wish to grow limited areas, either for grazing down by pigs or for home use, to experiment with this important crop.

DRY - BIBLE.

TREATMENT FOR THE DISEASE.

Mr. J. L. Burns, V.S., Government Veterinary Surgeon, replying to inquiries in reference to mortality among cattle at Beenup, gives the following diagnosis, and also method of treating the complaint:—

"From the post-mortem examination as described by you and the symptoms during life, I should say the cow you lost on Saturday last died from impaction of the stomach. The state you found the intestines in also confirms this. I do not think the leather strap you refer to had anything to do with the animal's death. Had the cow eaten palms, or the nuts of same, shortly before dying they would certainly be discovered in the stomach. Large numbers of cattle as well as sheep and other animals are found affected in the way you mention at the present season of the year, especially when turned out in the bush and left with nothing only what they can pick up themselves. The growing of green feed and the application of phosphates to the soil have, in many instances, helped to prevent mortality among stock of a similar nature to that related by you.

"Meanwhile, the best thing you can do in any future cases is to give the cow a drench of one pint of raw linseed oil with the addition of 10 drops of Croton oil. If this is administered in time it will have a good effect. Epsom salts (Magnesium sulphate) should also be given in the drinking water from time to time. To do this the cattle will, of course, require to be brought in and watered out of troughs."

SOIL CAPILLARITY.

Water in the soil is drawn to the surface by what is known as capillary action. An example of the working of this capillary force can be observed when open tubes, having a very small bore, are placed in a vessel of water or other liquid. It will be seen that the level of the liquid in the tube has risen higher than the general surface in the vessel. Similarly, if a piece of loaf sugar is placed in a saucer containing a small quantity of water, so that only a fraction of the sugar is immersed, the liquid will be observed to mount rapidly through the substance of the sugar, until the whole piece is saturated. This ascent of the water is also due to the working of capillary force, and water in the soil rises to the surface in the same way. The following notes are extracted from an article on this subject, which is one of great importance to the practical cultivator, that lately appeared in the American "Journal of Agriculture":—

"Water deep down in the soil is attracted and drawn to the surface of the soil grains there, the soil particles above them attract and draw the water to their surfaces, so in turn the different layers of soil particles draw the water to themselves and up till it reaches the surface. Once at the surface, the air claims the water and it is taken away from the soil by evaporation.

"Soil particles not only have the power of drawing water to themselves, but of holding it as well. By a simple mathematical law, the smaller the particle the greater proportional surface it has, hence the finer the particles are, the more water a given soil is capable of holding. Also, the closer together the soil grains are, the more retentive is the soil of moisture. For this last reason deep ploughing for breaking up large masses into fine grains, and heavy packing to bring these grains into close contact, are employed in dry-farming operations, and may be adopted in any region, in dry times, to make deep soil hold large amounts of water.

"The practical application of the principles of soil capillarity consists in first loosening the soil to as great depths as possible for creating large surfaces for exposure, allowing the soil to catch and imbibe as much water as possible, if it be not already saturated, and then stirring the surface frequently to break capillary action at the surface to prevent loss from above. The farmer who understands fully the laws of capillary action and so handles his soil as to receive and retain large amounts of moisture has mastered one of the greatest points of successful farming."

BACON CURING IN IRELAND: ROSCREA FACTORY.

A little over a year ago, the first Farmers' Bacon Curing Factory in the United Kingdom was started at Roscrea in County Tipperary, Ireland, and, as the pioneer movement in a new order of things in agriculture, the scheme has been closely watched, not only in Ireland but in Great Britain, many of the British colonies, and other countries. The shareholders are 3,800 in number and consist mostly of the small farmer class, and their individual interests are small, as may be gathered from the fact that their united paid up funds amount only to £11,383, out of which £5,000 is working capital.

The factory has now completed one year's trading, and it is gratifying to know that, notwithstanding the fact that the capital is so limited and that the markets have been unsettled, a handsome profit has been made.

The gross profit earned was £4,000, and after paying all expenses of working and depreciation, there was a satisfactory balance to the good of £308. The experience of the directors of the factory was unique, as they had constantly to decline business which they could have secured if more capital had been available. For the same reason it is anticipated that with an additional £5,000 of capital, the gross earnings of the factory would approximate £8,000.

Figures like these speak more eloquently than words, and it may now be safely stated that the principle of co-operation in bacon-curing has thus been established in the United Kingdom, and the recognition of this will bear fruit in the immediate future in the general impetus which will thus be given to swine husbandry and the general construction of bacon factories in the country, as an essential part of agricultural development.

GOVERNMENT LABOUR BUREAU.

MARCH REPORT.

Mr. James Longmore, Superintendent of the Government Labour Bureau, has furnished the following report of the operations for March:—

Perth.

Registrations.—The total number of men who called during the month in search of work was 866. Of this number 418 were new registrations and 488 renewals, *i.e.*, men who called who had been registered prior to the month of March, and since the 1st July, 1908. The trades or occupations of the 866 applicants were as follows:—Labourers 274, farm hands 96, handy lads

82. handy men 61, cooks 40, carpenters 38, gardeners 20, grooms 17, clerks 16, horse drivers 16, hotel hands 16, engine-drivers 15, bushmen 13, miners 12, painters 11, blacksmiths, bakers, fitters, 9 of each, bricklayers 8, kitchenmen, station hands, survey hands, 6 of each, butchers, firemen, stonemasons, yardmen, 5 of each, dairymen 4, plasterers 4, brickmakers, ironmoulders, sawmill hands, 3 of each, and 49 miscellaneous.

Engagements.—The engagements for the month totalled 393. The classification of work found was as follows:—Bushmen 93, labourers 70, farm hands 64, handy lads 37, handy men 23, cooks 16, lads for farms 12, carpenters 8, sawmill hands 8, hotel hands 6, miners 5, fencers, groom-gardeners, station hands, 4 of each, dairymen 3, married couples 3, bakers, carpenters (rough), gardeners, plasterers, survey hands, woodcutters, 2 of each, and 21 miscellaneous.

Fremantle.

Registrations.—The new registrations were 25, and the renewals 17, total 42. The classification was, viz.:—Labourers 25, handy men 4, handy lads 4, carpenters 3, cooks 2, clerks, grocers, plumbers, and tool sharpeners, one of each.

Engagements.—There were seven engagements, viz.:—Bushmen 4, labourers, plumbers, and station hands, 1 of each.

Northam.

Registrations.—The applicants for work numbered 7, classified as follows:—Farm hands 4, and 3 labourers.

Engagements.—The engagements were 5, viz.:—farm hands 4, and 1 clearer.

Kalgoorlie.

Registrations.—During the month there were 24 new registrations and 15 renewals, total 39. The classification was, viz.:—Labourers 11, miners 9, handy men 8, handy lads, yardmen, and carpenters, 2 of each, groom, fireman, kitchenman, traveller, and baker, one of each.

Engagements.—The engagements were 5, viz.:—Miners 2, carpenters, firemen, and labourers, one of each.

The female servants who called numbered 11. There were 5 new registrations and 6 renewals. The classification was, viz.:—Cooks 4, generals 2, charwoman, housemaid, housekeeper, kitchenmaid, and light general, one of each. There was one engagement—a cook.

Women's Branch, Perth.

Registrations.—The new registrations for the month were 103, and the renewals 56, total 159. The classification was, viz.:—Laundress-charwomen 27, light generals 29, cooks 21, generals 20, housemaids 16, housekeepers 9, lady-helps 8, useful girls 6, waitresses 6, nursemaids 4, kitchenmaids 3, nursery housemaids, married couples, and pantrymaids, 2 of each, and 4 miscellaneous.

Engagements.—There were 90 engagements, classified, viz.:—Laundress-charwomen 52, light generals 10, generals 7, housemaids 6, cook-laundresses 6, useful girls, housekeepers, kitchenmaids, and cooks, 2 of each, and one lady-help.

General Remarks.

The number of individual men who called at the Central Office, Perth, during the month in search of work was 866. Compared with the month of March of the previous year this shows a decrease of 288. The engagements for the month totalled 393. The percentage of applicants who found work was 45 as against 51 for the corresponding month of last year.

During the month there were 195 men assisted by railway passes from the Central Office, Perth. The fares refunded totalled £107 18s. 4d., and the sum of £12 19s. 7d. was received from employers for payment of fares to send workers, the whole amounting to £120 17s. 11d.

GARDEN NOTES FOR MAY.

The effects of the rainfall during April soon became evident in the appearance of young grass, and the retreat of summer dryness. The change was favourable for early garden work in the shape of soil cultivation, preparing plant beds, and sowing early seeds.

French and Broad Beans can be sown, to follow the April sowing. The rows should be kept hoed and clear of weeds, and potatoes or lettuce can be planted in between.

Beets.—Seed of different varieties can be sown, and young plants set out.

Cabbages, Cauliflower, and Carrots can be sown, and the transplanting of young plants extensively carried out.

Other valuable products, such as Brussels Sprouts, Lettuce, Leeks, Onions, Peas (early sorts), Endive, Parsnips, Turnips, and many others as there is ground space for, can be sown, or seedlings set out.

Keep up attention to all garden seeds by stirring the soil, putting down weeds, and destroying pests.

ORCHARD AND FLOWER GARDEN.

Orange and Lemon trees can be planted, also evergreen shrubs and ornamental or shade trees.

There is the usual formidable list of flower seeds offering a wide scope for selection, in which the nurseryman will be of assistance.

Bulbs of great variety can be planted.

FARM.

Beans, Barley, and Carrots for horses can be sown; also Cape Barley, Cape Oats, Flax, and Fodder Grasses, and Rabi Lucerne is a rich and heavy growing fodder. Mangel, Mustard, and Mustard are of value for stock. Parsnips, Peas, Rape, Sainfoin, Swedes, Turnips, Trefoil are also worth sowing for feeding purposes.

Wheat for grain or hay can be sown.

MARKET REPORTS.

GENERAL SUMMARY.

FARM PRODUCE.

The Easter holidays caused some interruption to the despatch of arrivals, and an accumulation of loads resulted. With resumption of business, prices generally were satisfactory. Best wheaten chaff, f.a.q., realised £4 10s.; good medium fetched £4, £4 2s. 6d., and £4 5s., and medium, from £3 7s. 6d. to £3 15s. Oaten chaff, from £3 17s. 6d. to £4 2s. 6d.

The wheat market, only slight supplies. Buyers were found at 4s. 8½d., good quality. Oats were not forwarded.

LIVE STOCK.

Good yardings of sheep are reported, and lively competition, with good prices for lines of quality. Horses are in good demand for farm purposes. The following prices give present market indications:—

Sheep.—Prime fat sheep, from 19s. 7d. to 19s. 9d.; fat sheep, 15s. 4d. to 15s. 5d.; medium, 12s. to 14s.; prime lambs made 14s. 4d.; good, 11s. 4d. to 12s.; fair, 10s.; store ewes, 7s.; store wethers, 7s. 6d.; good store lambs, 8s. 6d.

Pigs.—Porkers, from 23s. 6d. to 30s.; weaners, 10s.; sows, 30s.

Horses.—Medium draught geldings, from £27 10s. to £38, light sorts, £6 to £15.

FRUIT AND VEGETABLES.

The following are prevailing quotations:—

Fruit.

Apples: Jonathans, 5s. 6d. to 8s.; Adams' Permain, 3s. 9d. to 4s. 9d.; Shepherd's Perfection, 4s. 9d.; Cleopatras, 4s. 3d. to 5s.; Dunn's Seedling, 3s. 9d. to 4s. 9d.; Rome Beauties, 4s. to 5s.; Northern Spy, 4s. to 5s. 3d.; other varieties, from 2s. Pears: Bartlett, 6s. 3d. to 13s. 3d.; Vicars, 3s. 3d.; Bergamots, 8s. to 11s. 3d.; cookers, from 6s. Quinces, 2s. 3d. to 3s. 3d. Peaches, 9s. 6d. Lemons, 4s. 9d. to 8s. 3d. Grapes: Muscats, 3s. to 7s. 3d.; kerosene cases, 10s. 6d.; Centennials, 11s. 9d. to 12s. 6d.; Wortley Halls, 9s. 9d. to 11s. 6d.; Flame Tokay, 9s. 9d.; Santa Paula, 11s.; Ladies' fingers, 10s. 3d. to 11s. 9d.; Black St. Peter, 9s. 6d. to 10s. 3d.

Vegetables.

Tomatoes, 2s. 6d. to 6s. 6d. Cabbage, 7s. 6d. to 14s.; others, from 2s. 3d. Potatoes, 11s. to 11s. 6d. Pumpkin: ironbark, 4s. 9d. to 5s.; bugle, 3s. 3d. to 3s. 9d. Marrows, 1s. 3d. to 1s. 4d. Cucumbers, 4d. to 1s. 2d. Lettuce, 6d. to 1s. 1d.; inferior from 2d. Celery, 1s. 5d. to 3s.; inferior, from 4d. Rhubarb, ¾d. to 3d. French Beans, 1d. to 2½d. Peas, 2¾d. to 3¼d. Parsnips, 1s. 4d. to 2s. 3d. Carrots, 6d. to 1s. 3d. Turnips, 6d. to 1s. 9d. Beet, 5d. to 10d. Cauliflowers, 4s. 3d. to 10s. 9d.

LONDON WHEAT MARKET.

Messrs. W. Weddel & Co., London, in their fortnightly circular, dated March 12, state:—The tone of the market has been decidedly quieter during the past fortnight, and values have fluctuated considerably, in sympathy with the movements in the American markets. Prices had been forced too rapidly, and buyers are now pausing, as supplies in sight are ample for their immediate requirements. The high prices now ruling have brought out very large supplies of wheat from Australia and the Argentine, and also from America. It remains to be seen how long these heavy shipments can be maintained, but it is generally believed here that the pace has been too fast, and that a material falling-off must shortly manifest itself. On the Continent the markets have remained firm, with prices tending upwards, particularly in Germany and Austria, where the home-grown article is getting scarce. Severe wintry weather in these countries has caused anxiety regarding the autumn sown crops. In Russia the outlook is rather more favourable, and exports continue heavier than at the same time last year, although still on a moderate scale. At the close the market here is steady, but values are 9d. to 1s. per quarter lower than the best of the past fortnight. The weather in the United Kingdom has been exceptionally severe for the time of year. There are, however, few complaints regarding the condition of the autumn sown wheat, but farmers are not so pleased with the prospects for spring sowing. Among the sales reported by the firm is the following:—Western Australian wheat (per "Inverurie" loading), 10,000 quarters, 39s. 3d.

ADELAIDE PRODUCE MARKET.

Adelaide, April 13.

Business was resumed in the wheat markets to-day, but little was done. The buying price of wheat was advanced 2d., and is now 4s. 11d. per bushel, with parcels unobtainable at less than 5s. Flour is firm at £11 10s. Butter realised 1s. 1d. to 1s. 2d. Eggs advanced 2d.

MELBOURNE.

Melbourne, April 13.

Business in the produce market is not yet properly resumed. Wheat is firm in tone, quotations being nominal at 5s. to 5s. 1d. Bran sold up to 1s. and 1s. 4d.

Rainfall for the month of March, 1909, recorded at telegraphic stations in Western Australia, and averages.

STATIONS.	*Total for March, 1909, in points.	No. of wet days.	Average for March, 1908.	No. of Years Records.	STATIONS.	*Total for March, 1909, in points.	No. of wet days.	Average for March, 1908.	No. of Years Records.
TROPICS :					NORTH COOLGARDIE				
Wyndham ...	280	8	409	22	FIELDS :				
Turkey Creek ...	323	13	535	11	Sandstone ...	25	1	...	...
Hall's Creek ...	309	7	308	18	Wiluna ...	2	1	67	10
Fitzroy Crossing	103	5	328	15	Mt. Sir Samuel ...	Nil	...	40	8
Derby ...	252	4	409	23	Lawlers ...	19	1	56	12
Broome ...	18	4	409	19	Mt. Leonora ...	19	1	67	11
La Grange Bay...	40	3	378	18	Mt. Malcolm ...	27	1	50	11
Wallal ...	Nil	...	314	12	Mt. Morgans ...	31	2	89	9
Condon ...	7	1	364	19	Laverton ...	45	3	128	9
Bamboo Creek ...	Nil	...	409	11	Murrin Murrin ...	28	1	96	10
Marble Bar ...	2	1	252	14	Yundamindera	14	2	91	8
Warrawoona ...	88	2	295	9	Kookynie ...	14	2	92	7
Nullagine ...	46	1	259	11	Niagara ...	...	...	56	12
Port Hedland ...	Nil	...	352	11	Menzies ...	22	1	44	12
Whim Creek ...	38	1	689	11	Mulline ...	25	1	103	7
Roebourne ...	81	1	262	22					
Cossack... ..	Nil	...	222	27	COOLGARDIE GOLD-				
Fortescue ...	8	1	130	21	FIELDS :				
Onslow ...	Nil	...	91	23	Davyhurst ...	40	1	99	7
Winning Pool ...	Nil	...	167	11	Goongarrie ...	11	1	104	13
WEST COASTAL :					Broad Arrow ...	14	1	43	11
Carnarvon ...	Nil	...	52	26	Kurnalpi ...	1	1	64	12
Sharks Bay ...	Nil	...	25	15	Kanowna ...	40	2	113	13
Wooramel ...	Nil	...	22	10	Bulong ...	25	2	51	12
Hamelin Pool ...	Nil	...	39	23	Kalgoorlie ...	92	2	89	13
Northampton ...	6	2	42	27	Coolgardie ...	18	2	70	16
Mullewa ...	4	1	56	13	Burbanks ...	23	2	56	10
Geraldton ...	20	2	39	31	Widgemooltha ...	30	3	78	11
Greenough ...	6	2	36	27	Norseman ...	39	3	52	12
Dongarra ...	22	2	41	25	Boorabbin ...	17	1	61	14
Minginew ...	Nil	...	59	13	Southern Cross	4	1	82	19
Carnamah ...	3	1	72	21					
Dandarragan ...	8	2	62	11	S.W. COASTAL :				
Moora ...	10	2	56	11	Gingin ...	50	4	72	20
Walebing ...	40	5	71	25	Kalamunda ...	68	3	...	...
New Norcia ...	21	3	88	26	Guildford ...	92	3	65	29
MURCHISON FIELDS :					Perth Gardens ...	69	6	76	33
Peak Hill ...	Nil	...	164	11	„ Observatory	77	4	56	12
Abbotts ...	Nil	...	57	10	Fremantle ...	63	8	67	31
Gabanintha ...	Nil	...	60	9	Rottneat ...	54	4	49	27
Nannine ...	2	1	97	14	Rockingham ...	120	5	53	11
Cue ...	1	1	61	14	Jarrahdale ...	153	7	98	26
Day Dawn ...	Nil	...	59	13	Mandurah ...	132	6	82	19
Lake Austin ...	Nil	...	67	11	Pinjarrah ...	126	7	86	30
Lennonville ...	Nil	...	94	8	Collie ...	170	8	89	9
Mt. Magnet ...	Nil	...	89	14	Brunswick Junct.	156	7	...	...
Yalgoo ...	6	1	59	12	Bunbury ...	113	5	101	32
Murgoo ...	Nil	...	69	20					

*100 points=1in.

RAINFALL—continued.

STATIONS.	*Total for March, 1909, in points.	No. of wet days.	Average for March, 1908.	No. of Years Records.	STATIONS.	*Total for March, 1909, in points.	No. of wet days.	Average for March, 1908.	No. of Years Records.
S.W. COASTAL—con- tinued.					S.W. INLAND—con- tinued.				
Donnybrook ...	148	9	113	8	Arthur ...	81	5	96	18
Busselton ...	129	6	85	28	Wagin ...	81	4	89	18
Cape Naturaliste	135	7	129	5	Katanning ...	115	9	98	17
Karridale ...	171	9	128	15	Broomehill ...	120	4	91	18
Cape Leeuwin ...	119	15	105	12	Kojonup... ..	99	4	80	24
					Greenbushes ...	153	9	102	16
S.W. INLAND:					Bridgetown ...	150	11	99	21
Kellerberrin ...	24	2	85	16					
Meckering ...	48	2	69	11	SOUTH COASTAL:				
Newcastle ...	30	3	71	29	Mt. Barker ...	234	17	127	22
Northam ...	366	3	62	28	Albany ...	298	18	135	32
York ...	137	3	60	32	Breaksea ...	288	19	108	19
Beverley ...	38	3	57	26	Bremer Bay ...	137	7	108	24
Brookton ...	42	2	...	...	Hopetoun ...	71	9	110	7
Wandering ...	121	6	92	20	Ravensthorpe ...	29	6	93	7
Pingelly ...	444	4	62	18	Esperance ...	45	8	107	25
Narrogin ...	114	4	78	17	Israelite Bay ...	24	9	95	24
Marradong ...	96	5	47	11	Balladonia ...	137	4	100	18
Williams ...	36	4	67	24	Eyre ...	42	4	68	24

*100 points=lin.

REMARKS ON THE RAINFALL FOR MARCH, 1909.

An excess over the average is shown throughout that portion of the S.W. lying between Rottnest and Breaksea, on the coast, northwards through Mt. Barker, Broomehill, Katanning, Narrogin, Beverley, and Northam, and then westerly to Rottnest. The only other stations in the State to show an excess are: Hall's Creek, in the East Kimberley; Kalgoorlie, on the goldfields; and Balladonia and Bremer Bay in Southern areas.

Throughout the remainder of the State a deficit is shown, being most marked on the N.W. coast, between Broome and Onslow, and extending inland to Nullagine, the greatest decrease being noted at Whim Creek, where the deficiency is 651 points.

In the Kimberley district light to heavy thunderstorms were recorded during the first eleven days, Hall's Creek registering 160 points on the 17th. From the 12th to the 16th no rain fell, and from the 16th to the end of the month only light, scattered showers were noted.

With the exception of one or two very light showers towards the end of the month, no rain fell over the Murchison Fields.

Over the Coolgardie Fields, rain was general on the 3rd, and a few scattered thunderstorms fell on the 4th, Kalgoorlie registering 81 points, but from this onwards, excepting light, scattered showers on the 27th, 28th, and 29th, no further rain was registered.

Coming now to the S.W. and S. districts, light to moderate showers fell from the 2nd to the 5th, mostly confined to the coastal areas. Heavy local

rain was, however, recorded at Northam and York on the 3rd. Between the 6th and 16th, only a few very light, scattered showers fell, while from the 17th to the 26th, light to moderate rain was recorded in south coastal areas only.

Light to heavy rain was registered at the majority of stations in the S.W. and S. on the 27th and 28th, and a few showers were noted on the south coast from the latter date to the end of the month.

EDITORIAL REQUEST.

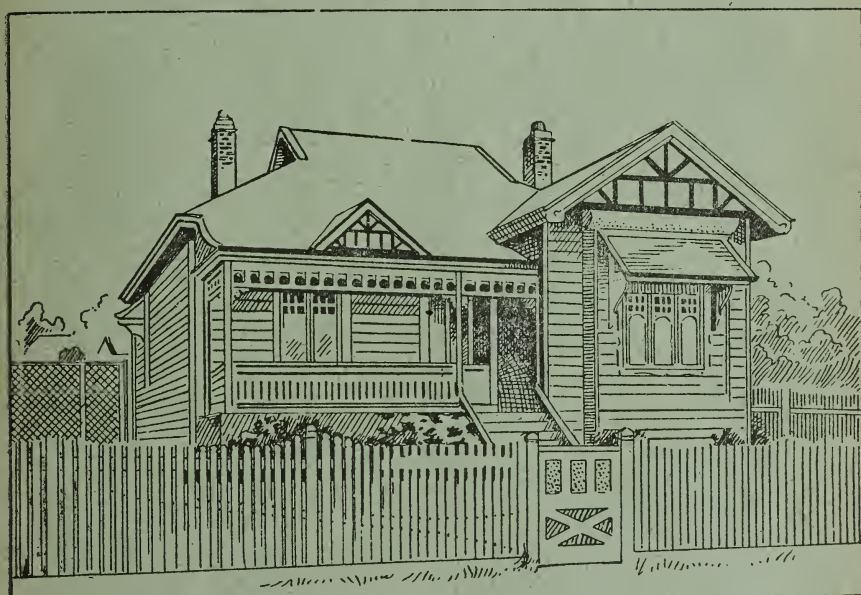
Correspondence and Queries are invited from subscribers and readers of the Journal on any subject of interest to agriculturists and other settlers on the land, either conveying useful information or seeking it. Suitable letters and contributions will be published and answers to queries given in the succeeding issue, if communications are received by the Editor not later than the fifteenth of each month.

Secretaries of Agricultural Associations, Societies, and Farmers' Clubs are kindly requested to supply corrections of the lists published in the Journal, such as changes of appointments, dates of shows and meetings, as well as any other items of interest.



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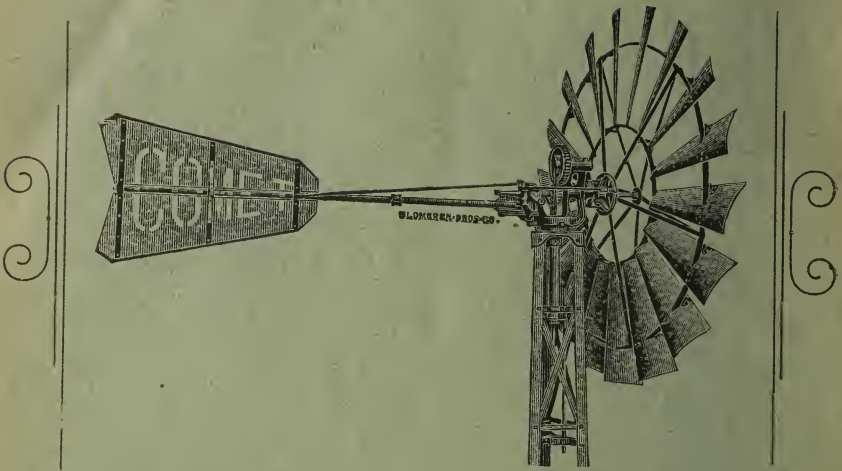
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SOCIETY.	SECRETARY.
Albany Agricultural and Horticultural Society	W. H. Richardson, Albany
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Bridgetown Agricultural Society	T. Rossiter
Bunbury Agricultural Society	W. S. Hales
Busselton Agricultural Society	A. R. Bovell
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Irwin Districts Agricultural Society	F. Waldeck, "Bonniefield," Dongarra
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Katanning Agricultural Society	W. W. Brunton
Kelmscott Agricultural Society	H. Cross, Kelmscott
King River Settlers' Association	R. H. Playne, Albany
Kojonup Agricultural Society	A. J. McGrath, Kojonup
Lower Blackwood Farmers' and Graziers' Association	P. D. E. de Nève, Lower Blackwood
Moorra Agricultural Society	P. W. Glacken
Mt. Barker Rural Association	A. R. Parker, Mount Barker
Murray Agricultural Society	J. D. Paterson, Pinjarra
Narrogin-Williams Agricultural Society	G. G. Lavater, Narrogin
Nelson Agricultural Society	T. Rossiter, Bridgetown
Northam Agricultural Society	V. H. Spencer, Northam
Pingelly-Mourambine Agricultural Society	A. A. Kent, Pingelly
Royal Agricultural Society of W.A.	Theo. R. Lowe, Perth
Southern Districts Agricultural Society	Percy Smith Bignell, Busselton
South-West Central Agricultural and Horticultural Society	F. H. Layton, Donnybrook
Swan Agricultural and Horticultural Society	H. A. Levenish, Guildford
Toodyay Agricultural Society	A. James, Newcastle
Wagin-Arthur Districts Agricultural, Horticultural, and Industrial Society	W. E. Clarke, Wagin
Wellington Agricultural and Pastoral Association	W. S. Hales, Bunbury
Williams Agricultural Society	H. V. Carne, Williams
York Agricultural Society	J. E. Spark, York

UNAFFILIATED SOCIETIES.

Albany and District Settlers' Association	J. Mowforth, Albany
Albany and King River Settlers' Association	R. H. Playne, King River
Armadale Progress Association	John Gould, Armadale
Balingup Farmers' Association	P. V. Mauger, Balingup
Bedfordale Agricultural and Horticultural Society	T. W. Ottaway, Bedfordale,
Boyanup Farmers' and Progress Association	W. Eccleston, Boyanup
Boyp Brook Agricultural and Vigilance Committee	Wm. Vincent, Boyp Brook
Brunswick Farmers' Association	Arthur E. Clifton, Brunswick
Bullsbrook Progress Association	D. Strachan, Bullsbrook.
Capel Farmers' Association	C. J. Rooney, Capel.
Central Fruitgrowers' Association	A. Barratt, Perth
Coogee-Spearwood Agricultural and Horticultural Society	R. Barron, Hamilton-road, Spearwood
Cookernup Farmers' Progress Association	A. L. Cumold, Cookernup
Dagin-South Caroling Progress Association	W. G. Haines, Caroling, East Beverley.
Darling Range Horticultural Society	A. C. Armstrong, Sawyers' Valley
Deepdale Farmers' and Fruitgrowers' Association	Chas. M. Lukin, Newcastle
Denmark Settlers' Association	H. V. Buckley, Denmark
Drakesbrook Agricultural Association	H. McNeill, Drakesbrook
Esperance Agricultural, Horticultural, and Floricultural Society	R. H. Dean, Esperance
Fremantle Horticultural Society	Hugh C. Anderson, Hon. Sec., c/o Union Stores, Ltd., Fremantle
Goldfields Dog, Poultry, and Horticultural Society	J. A. McNeill, Coolgardie
Goldfields Agricultural Society	Monmouth Smith, Kalgoorlie
Goomalling Farmers' Association	W. Gray, Goomalling, via Northam
Greenhills Farmers' Club	James McManus, Irishtown
Greenough Farmers' Association	J. McCartney, Walkaway
Harvey Farmers' Club	W. E. Ash, Hon. Sec., Harvey
Harvey Citrus Society	Kenneth Gibson, Harvey
Horticultural Society of W.A.	L. S. Dean, c/o Messrs. Sandover and Co., Perth
Jennapullen Agricultural Society	A. C. Morrell, Jennapullen
Jurakine Agricultural Society	W. Hayward, Jurakine
Kalamunda Horticultural Society	A. Sanderson, Kalamunda
Lake Pinjar Agricultural Association	H. Hartman, Pinjar
Mandurah Progress and Agricultural Association	C. Tuckey, Mandurah
Marbellup and District Settlers' Association	F. Mullineaux, Evergreen Valley, Marbellup, G.S.R.

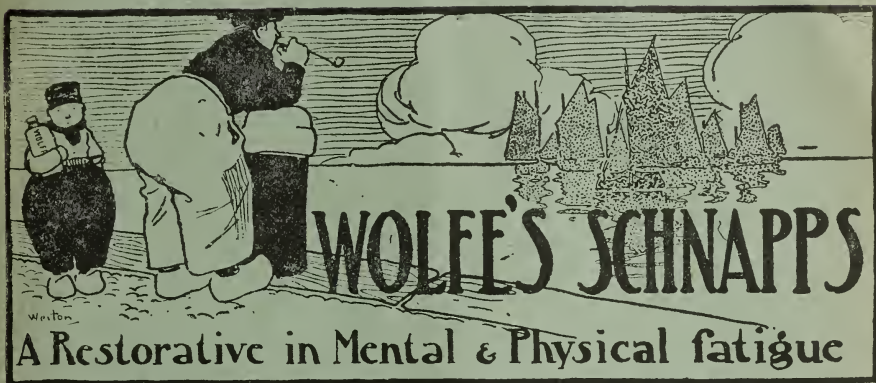
SOCIETY.	SECRETARY.
Monwongie Progress Association	E. A. Batt, Monwongie, Popanyinning
Moonyoonooka Farmers' Association	W. H. Williams, Moonyoonooka
Murray Horticultural Society	Miss M. Alderson, Pinjarra
Newcastle Branch Bureau	W. A. Demasson, Newcastle
Newtown Progress Association	T. A. Thurkle, Woodlands, Vasse
North Greenough Farmers' Association	W. F. Stansfield, Bootenal
North Lake Progress Association	A. R. F. Johnston, c/o W. Lyons, South Road, Fremantle
Parkerville Agricultural Society	S. Ramsay, Parkerville
Plantagenet Beekeepers' Association	Vacant
Popanyinning Progressive League	P. R. Bayliss, Popanyinning Pool, G.S. Railway
Preston Progress Association	T. B. Jones, Preston
Quindalup Progress Association	W. E. Carter, Busselton
Spearwood Progressive Association	R. Barton, Hamilton-road, Spearwood, Fremantle
Talbot Progress Association	O. Ryan, York.
Thomson's Brook Progress Association	J. W. Pudman, Thomson's Brook.
Toodyay Vine and Fruitgrowers' Association	W. A. Demasson, Newcastle.
Tenterden Agricultural Society	J. Lunt, Tenterden
Upper Chapman Farmers' and Fruitgrowers' Association	D. O'O. Kehoe, Narra Tarra
Victoria Plains Farmers' Association	J. Halligan, Summer Hill, Victoria Plains
Waigerup Agricultural Hall Association	W. J. Eastcott, Waigerup
Wandering District Agricultural Society	W. B. Smithson, Wandering
Wanneroo Farmers' and Gardeners' Association	F. J. Hollins, Wanneroo
Wanneroo Farmers' Vine and Fruitgrowers' Association	T. W. Harris, Wanneroo
West Swan Producers' Association	J. H. Stone, Guildford
Wongamine Farmers' Club	G. W. B. Smith, Wongamine
Wonerup Progress Association	P. S. Brockman, "Reinscourt," Busselton
Woorloo Progress League	T. H. Ilbery, Woorloo
W.A. Beekeepers' Association	W. Potter, Goldsworthy Road, Claremont
Wagin Beekeepers, Poultry Fanciers, and Fruitgrowers' Association	F. A. Pfeiffer, Wagin.
West Albany Settlers' Association	Alfred Burvill, Grasmere, via Albany
West Coolup Progress Association	Stanley Caris, Pinjarra
West Pingelly Progress Association	J. J. Parker, Neta Vale, Pingelly.

POULTRY AND DOG SOCIETIES.

SOCIETY.	SECRETARY.
Albany	J. F. Cuddihay, Albany
Boulder	W. R. Rossiter, Boulder
Bunbury	E. Krachler, Bunbury
Claremont	C. H. Evans, Claremont
Collie	A. E. Smith, Collie
Coolgardie	J. S. Stewart, Council Office, Coolgardie
Fremantle	A. J. Parkin, Queen Street, Fremantle
Gingin	Chas. W. Johnson, Gingin
Kalgoorlie	H. R. Bristow, Kalgoorlie
Subiaco Poultry, Pigeon, and Cage Birds' Society	E. Austin, Hensman Road.
West Australian	Jas. Bolt, Hay Street.
West Australian Canary, Pigeon, and Bantam Club	Harry Barnett, 159 Barrack Street, City.
West Australian Minorca Club	E. J. Ford, Rockton Road, Claremont.

DATES OF MEETING OF SOCIETIES

- Albany and District Settlers' Association—
At Torbay Junction.
- Armadale Progress Association—
Last Tuesday in each month, at 8 p.m.
- Boyanup Farmers' and Progress Association—
First Saturday in each month.
- Brunswick Farmers' Association—
Wednesday preceding full moon, at 8 p.m., at the Agricultural Hall.
- Capel Farmers' Association—
Last Saturday on or before the full moon, at 8 o'clock.
- Greenough Farmers' Club—
January, April, July (annual), and October.
- Jarrahdale and Serpentine Agricultural Society—
Meet the Saturday preceding the full moon, at 8 o'clock p.m., at the Agricultural Hall, Mundijong.
- ROYAL AGRICULTURAL SOCIETY OF W.A.—
Second Tuesday in each month.
- Upper Chapman Farmers' and Fruitgrowers' Association—
Last Saturday in the months of December, February, April, July, August.
- W. A. Beekeepers' Association—
Second Wednesday in each month, Museum, Department of Agriculture, 7.30 p.m.
- Wanneroo Farmers' and Gardeners' Association—
Saturday on or before full moon, at Wanneroo State School.
- West Coolup Farmers' Association—
Second Saturday in each month, at 3 p.m., at Mr. Barry's residence.



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A Restorative in Mental & Physical fatigue

E. SYMONDS, Seed & Plant Merchant. . .

BUSINESS ADDRESS :

WELLINGTON STREET, PERTH, W.A.

THE MOST RELIABLE HOUSE
For ALL THE BEST in
SEEDS AND PLANTS for
GARDEN, FARM, AND STATION.

SPECIALTIES IN SEEDS : American grown Vegetable Seeds, Melons, Tomatoes; New Zealand Peas and Beans; Grasses, Clovers, and Millets; English and Continental Flower Seeds; Bird Seeds and Sundries.

AFRICAN WONDER GRASS ROOTS in quantities of not less than 5,000, 12s. 6d. per 1,000, free on rail, Pinjarra.

Before buying elsewhere write for Illustrated Catalogue.

BRIGGS & ROWLANDS,

—Lime Works, Coogee.—

AGRICULTURAL LIME

LIME FOR SPRAYING
PURPOSES

Cowhair. White Sand. Flux.

Absolutely the HIGHEST percentage of Lime in the State. Every bag of Lime
advertises itself. Write for particulars before purchasing elsewhere.

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PERTH.

GOVERNMENT SIDING INTO WORKS.

Eggs, 1s. per case (25 doz.) per calendar month.

ICE and COOL STORAGE.

RATES MODERATE.

Farmers and Fruit Growers write for particulars to

THE MANAGER,

Govt. Refrigerating Works,

Wellington Street, Perth.

EDWARD ARUNDEL

(Late R. BECHTEL & Co.),

**WHOLESALE AND RETAIL MANUFACTURING SADDLERS,
HARNESS, COLLAR, AND BAG MAKERS.**

*Every Description of Ironmongery, Leather, Buckles,
Collar-check, Hair, Serge, Hames, Chains, etc., etc.*

Contractors to W.A. and Commonwealth Governments.

Goods well bought are half sold, and to prove the truth of this I am offering you SADDLES and HARNESS at 25 per cent. CHEAPER than you can buy elsewhere. There is no question that I do the Saddle and Harness Trade of the State. A visit to our factory will convince you that our "CUT CASH PRICES" are the best ever offered to the Public.

ALL GOODS GUARANTEED OF SUPERIOR QUALITY.

Buy from the Largest Manufacturer in the State and
SAVE MONEY.

Head Office and Show Rooms:

87 BARRACK STREET.

Saddlers' Ironmongery and Factory:

179 MURRAY ST., PERTH.

AGRICULTURAL BANK.

ADVANCES TO FARMERS.

Advances are made under Section 28 of "The Agricultural Bank Act, 1906," for:—

- (a.) Ringbarking, clearing, fencing, draining, or water conservation.
- (b.) Discharging any mortgage already existing on holding; or
- (c.) The purchase of stock for breeding purposes,

ON THE SECURITY OF:—

- (a.) Holdings in fee simple; or
- (b.) Holdings under Special Occupation Lease or Conditional Purchase from the Crown; or
- (c.) Homestead Farms; or
- (d.) Such other real or leasehold property as the Trustees may think fit.

Advances may be made of an amount not exceeding £300 to the full value of the improvements proposed to be made.

Further advances may be made of an amount not exceeding £200 to one-half the value of the additional improvements proposed to be made.

No advance shall be made to discharge an existing mortgage to an amount exceeding three-fourths of the value of the improvements already made on the holding. The improvements recognised for this purpose are:—Ringbarking, clearing, fencing, draining, and water conservation. Advances are not made for "completion of purchase"; liabilities which have been incurred in the development of the security only being recognised.

At no time shall the advances to any one person (or number of persons if borrowing conjointly) exceed the sum of £500, and no sum exceeding £100 shall be advanced to any one person for the purchase of breeding stock. In applications for this purpose, the condition and capability of the security to successfully carry stock is of paramount importance.

Persons under 21 years of age, being unable to legally mortgage, are debarred from borrowing from the Bank.

Every application for an advance must be made on the Bank's forms, and shall contain all particulars required thereon.

Applications may be for sums of £25 or any multiple thereof, not exceeding £500. Each application must be accompanied by a valuation fee of 1 per cent. of the amount applied for. No refund of fee is allowed after an inspection of the security has been made.

Mortgages are prepared free of charge, but borrowers are required to pay the statutory charges in connection with their registration. These are:—

- (a.) Stamp Duty of 2s. 6d. for each £50 of the amount of mortgage up to £300; and
- (b.) A registration fee of 5s. for each Conditional Purchase or Homestead Farm Block mortgaged.

The Leases or Occupation Certificate, as the case may be, together with the above fees, must be in the possession of the Bank before a mortgage can be prepared.

NOTICES OF APPROVAL are insufficient for this purpose.

Intending borrowers are requested to note that no advances except for the specific purposes of discharging liabilities, or for purchasing breeding stock, are made against improvements effected prior to date of application. Applications should, in every instance, be lodged prior to commencement of work, and moneys are then paid over in progress payments as the work proceeds.

Repayments of loans extend over a period of 30 years, except in the case of stock advances, which have a currency of seven years only. Interest is charged at the rate of 5 per cent. per annum, payable half-yearly.

To the MAN ON THE LAND.

Are your Wife and Children fully provided for in case of your Death?

What would be their position with that advance from the Agricultural Bank undischarged?

Effect a Life Policy with the AUSTRALIAN MUTUAL PROVIDENT SOCIETY.

Follow the example of Hon. Jas. Mitchell, Minister for Agriculture, the holder of Policy No. 130373.

Actual Results:-	£	s.	d.
Policy effected in December, 1885, under Table A for	300	0	0
Bonus additions to 31st December, 1906	175	18	0
Full sum assured to date	475	18	0

And Bonuses will continue to be added each year.

Annual Premium, £5 15s. Total Premiums paid to 31st December, 1906, £126 10s.

In case of death, the Society would *Return* as Bonuses the *Total Premiums Paid*, with a further sum of £49 8s. added. The full sum assured, £300, would also be paid to the member's representatives.

DELAY IS DANGEROUS. ASSURE AT ONCE.

DIRECTORS IN WESTERN AUSTRALIA:

HON. G. RANDELL, M.L.C., Chairman: JAMES MORRISON, Esq., J.P., Deputy Chairman;
JOHN F. STONE, Esq., J.P.; CHARLES HUDSON, Esq.

GAVIN LUCAS, Resident Secretary.

Office: ST. GEORGE'S TERRACE, PERTH.

District Office: Maritana Street, Kalgoorlie
(J. G. Holdsworth, District Secretary).

Local Agencies at Albany, Bunbury,
Geraldton, Northam, York.

* * *	<h1>Incubators</h1>	* * *
<p>ALL POULTRY, DOG, AND CAGE BIRD REQUISITES.</p> <p>Write for Catalogue.</p> <p>*****</p>	<h2>The Prairie State Incubator</h2> <p>Will hatch CHICKS or DUCKS.</p> <p>70 Egg, £3 5s. 115 Egg (Sand Tray), £5 10s.</p>	
<p>JAMES GOSS, Wireworker, 711 Hay St., PERTH (Opposite Brennan's)</p>		

Perth's Fashionable Tailors Cut Suits to your Measure.

None but skilled and experienced workmen ever find employment in our cutting room. Cutting from measurements taken by the customer is necessarily more difficult and particular work than if we had measured you ourselves, but long experience has made our work wonderfully accurate.

We guarantee Fit, Materials, Style and Workmanship.
Our Prices are absolutely Lowest for Reliable, Satisfactory Tailoring.

A postal request will bring patterns and self-measurement form by return. Write to-day.

A. J. SHACKELL & Co., 698 Hay Street, Perth.

'Phone 1224. Box G.P.O. 26.

WESTERN AUSTRALIA.

Prominent Liberal Provisions in Land Laws

—AND—

CONCESSIONS TO SETTLERS.

1. A Homestead Farm of 160 acres. Application fee, £1; survey fee, £3; stamp, 1s. Conditions: Personal residence for six months in each of the first five years after survey, or residence on C.P. lands within 20 miles. Boundaries: Half to be fenced within five years; the whole within seven years. Improvements: 4s. per acre must be expended in the first two years, 6s. per acre during next three years, 4s. per acre during last two years, making total of 14s. per acre in seven years.

2. Conditional Purchase Lands.—From 100 acres to 1,000 acres at from 10s. per acre, payable in 40 half-yearly instalments at the rate of 3d. per acre. Conditions: Personal residence for 5 years, one-tenth of boundaries to be fenced within two years, the whole within 5 years, and improvements to the full value of purchase money to be made within 10 years. Half the value of boundary fence may be allowed in estimating value of improvements. Conditional Purchase Lands may also be selected without the condition of residence, in which case the improvements in value must equal one and half the amount of the purchase money, but not exceeding £1 10s. per acre.

3. Land for Orchards, Vineyards, or Gardens, from 5 to 50 acres, from 20s. per acre, payable in three years. Improvements, including fence, to be completed in three years.

4. Full particulars as to conditions, areas, and further methods of obtaining land will be found in the pamphlet "Selector's Guide," obtainable on application to the undersigned.

5. Surveys are carried out by the State at half cost to selectors.

6. The Agricultural Bank renders monetary assistance to enable settlers to effect improvements when land has been substantially fenced.

7. On a selector proceeding to any district for the purpose of selecting land, the nearest Land Agent will supply all information, plans, and pamphlets, as well as a guide to conduct him to available land free of charge. In the event of an application for land being made, with the necessary deposit, a refund of railway fare may be obtained, if the deposit on land selected is equal to 50 per cent. more than the amount of the fare, and provided the application for refund is supported by a certificate from a Government Land Agent stating the place from which the selector proceeded for the purpose of selecting.

8. The Railway Department grants a special concession in the way of fares and freights for a new selector's family and goods, on production of a certificate of *bona fides* from the Lands Department. Any selector of an area of not less than 500 acres first-class land may obtain from the Lands Department an order for railway tickets and freight for his family, goods, and chattels, from the station nearest his present or late residence to the station nearest the land selected, the amount to be repaid to the Department by the selector by bills at 12 and 24 months, with 5 per cent. interest added; until the bills are paid the land cannot be transferred or mortgaged except to the Agricultural Bank.

9. Any new selector residing on his land can arrange passages for his wife and family to this State through the Colonial Secretary's Department.

10. Agencies are established at Menzies, Coolgardie, Kalgoorlie, Southern Cross, Cue, Northampton, Geraldton, York, Northam, Beverley, Newcastle, Bunbury, Katanning, Albany, Bridgetown, Busselton, Narrogin, Wagin, Pingelly.

R. CECIL CLIFTON,
Under Secretary for Lands.
Perth, Western Australia.

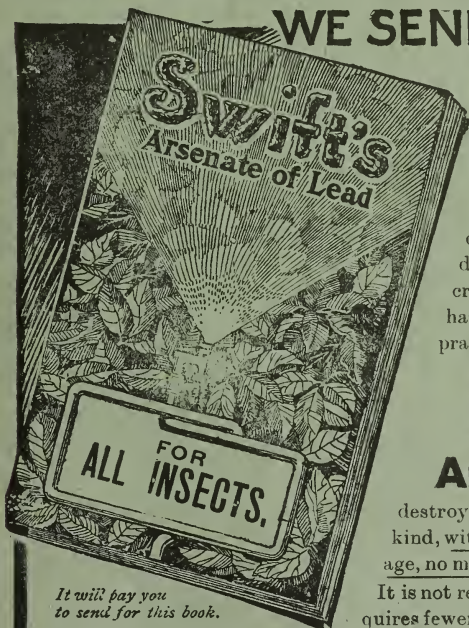


FOR
DAIRY
CATTLE.

H. W. POTTS, F.C.S., Dairy Expert, reports as follows:—

"Sunlight Oil Cake is specially to be recommended as a suitable concentrated food for Dairy Cattle and as a means of prolonging and augmenting the milk flow in the extremes of winter and summer when natural fodder or grasses are scarce. It is highly nutritious, easily digested and assimilated."

Note the name "Sunlight" is branded on every cake.



WE SEND THIS BOOKLET
FREE.

To every Fruit Grower, who wants to increase his profits 25 to 30 per cent. by ridding his orchards of the insect pests that damage them and decrease the crops. The demand for this book has been very great, showing its practical value.

Swift's Arsenate of Lead

destroys all leaf-eating insects, of every kind, without burning or scorching the foliage, no matter how strong a solution is used.

It is not readily washed off, and therefore requires fewer applications than any other spray

*It will pay you
to send for this book.*

—less labor, smaller expense, larger crops, greater profits. Used and recommended by leading fruit-growers, orchardists and shade-tree owners everywhere.

It is White. It Sticks to Foliage. Can't Burn or Scorch.

F. H. FAULDING & CO., 341 Murray St., PERTH.

WM. SANDOVER & CO., HAY STREET, PERTH.

AGRICULTURAL BANK.

* * * * *

Advice to Applicants

* * * * *



Intending clients of the Bank are requested to note the following directions, particularly with

regard to anticipating their requirements. By so doing much of the inconvenience from delays, which are at present unavoidable, may be obviated:—

DON'T DEFER making application until you are in financial difficulties. With ordinary foresight you should be able to anticipate your requirements by at least two or three months. If you are in any doubt as to being able to tide over the unproductive stages of development, put in an application before you start your improvements. If the request is a reasonable one you can confidently look for assistance, and, in the event of approval, the proposed work effected since date of application is paid for. It should be clearly borne in mind that the Bank does not pay against work done prior to that date.

As soon as you have lodged an application, see that the Leases or Occupation Certificate, as the case may be, of the security offered are in your possession, and ready for production when required. If these have not been issued you should apply at once to the Under Secretary for Lands.

Notices of Approval are not sufficient for the purpose of a mortgage.

No moneys can be paid over until a mortgage over the security offered has been completed. This is prepared free of charge and forwarded for signature as soon as an application has been approved in Executive Council, provided the security has in the meantime been completed, and a registration fee of 5s. paid on each Conditional Purchase or Homestead Farm block, with stamp duty of 2s. 6d. for each £50 of the amount of mortgage.

For further directions see page vii.

May be you like Saving Money?

IF SO,

I can Help.

I have just received a portion of my Melbourne-made Stock, which was delayed.

It comprises—

Ladies' real Chrome Glace Kid Oxford Shoes.

Ladies' real Chrome Glace Kid Button Shoes.

Ladies' real Chrome Glace Kid Lace Boots.

Ladies' real Chrome Glace Kid Button Boots.

NOTE that little word KID; it does not mean the skin of the giddy baa lamb, but KID, good tough KID, with a glace surface, and it wears well with 2 big W's.

Don't forget EZYWALKIN'S Melbourne-made Goods are genuine, and are building his trade.

Also to hand—

Melbourne-made Men's Boots in Tan and Black from 8s. 11d. to 16s. 6d.

EZYWALKIN'S GREAT SPECIALTIES.

Melbourne-made Boots and Shoes sound, durable, and neat. Boots and Shoes that can look at a bale of brown paper and know they are NOT related.

See here 2 lines—

Ladies' Glace Kid Ada Shoes, elysium for tired feet, 8s. 11d.

Ladies' Glace Kid Oxford Shoes, 6s. 6d.

Both made of Chrome Glace.

SPECIAL FOR THIS MONTH.

Men's No. 86 Tan Willow Calf Balmoral, welted, with round toe, 12s. 6d.

Truly

EZYWALKIN

Is a Friend to the Pockets.

Avoid the High Tariff and wear

EZYWALKIN'S MELBOURNE-MADE BOOTS & SHOES.

You will never regret it.

F. E. Randell & Co.

Produce Merchants,

338 WELLINGTON STREET, PERTH.

PRIME CHAFF, WHEAT, BRAN,
POLLARD, OATS, ETC., ALWAYS
—ON HAND.

Sole Agents for . . .

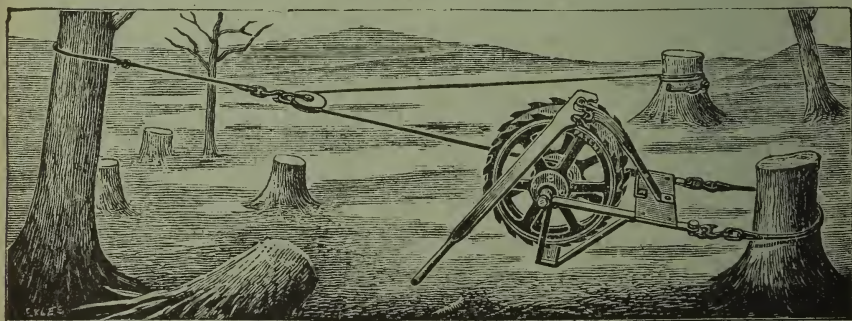
Seccombe's Famous Hand-shaken Paspalum Seed.



FARMERS, ORDER EARLY TO AVOID DISAPPOINTMENT.

"BUNYIP" TREE PULLER

SIMPLE. EFFECTIVE. PORTABLE.



Complete with Cables, Block, Lever, and Extension Lever.
Price, £20.

GEO. P. HARRIS, SCARFE & CO., LTD.,
MURRAY STREET, PERTH.

Stock, etc., for Sale.

NARROGIN STATE FARM.

10 2-TOOTH LINCOLN RAMS (our own breeding). Very nice lot for breeding and quality. From 3 to 4 guineas each.

14 LINCOLN RAMS, 4 and 6-TOOTH (imported from Eastern States). In different lots. 2 to 3 guineas each.

6 SHROPSHIRE RAMS, 2-TOOTH (our own breeding.)

6 2-TOOTH SHROPSHIRE RAMS at 3 Guineas.

2 2-TOOTH LINCOLN RAMS at 3 Guineas.

4 4-TOOTH LINCOLN RAMS at 2½ Guineas.

2 6-TOOTH MERINO RAMS at 3 Guineas.

18 2-TOOTH MERINO RAMS at 4 Guineas.

Following Seeds :— LINSEED FLAX, INDIAN GRAM,
PHALARIS COMMUTATA, AND OTHERS.

SEED WHEAT. MALTING BARLEY.

3 DEXTER-KERRY BULLS. 4 ANGORA BUCKS (2-TOOTH).

BERKSHIRE PIGS—YOUNG BOARS AND SOWS.

M. YORKSHIRE PIGS—YOUNG BOARS AND SOWS.

POULTRY—

WHITE LEGHORNS

BROWN LEGHORNS

PLYMOUTH ROCKS

BUFF ORPINGTONS

MINORCAS

SILVER WYANDOTTES.

PEKIN AND INDIAN RUNNER DUCKS.

TOULOUSE GEESE. TURKEYS.

For particulars apply to the Manager,

R. C. BAIRD.

BRUNSWICK STATE FARM.

FIVE YOUNG BERKSHIRE BOARS, 12 weeks old, by "Ringleader,"
out of pedigree sows.

Apply to Manager.

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„ „ 6 months' contract	10	4	0
„ „ 12 „ „	18	0	0
Half page, per single issue	1	5	0
„ „ 6 months' contract	6	15	0
„ „ 12 „ „	...	...	...	...	12	15	0
Quarter page, per single issue	...	...	...	...	0	15	0
„ „ 6 months' contract	...	...	...	...	4	5	6
„ „ 12 „ „	...	...	...	...	8	6	6

The following discounts will be allowed in cases where advertisements are paid for in advance:—

7½ per cent. discount when paid 12 months in advance.

5 „ „ 6 „ „
2½ „ „ 3 „ „

TENT, WATERBAGS, . .

. . TARPAULIN, . .

FLAG MANUFACTURER.

TRADE SUPPLIED AT LOWEST RATES.

Flags, Tents, and Marquees for Hire.

J. H. Graham,

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(Late of Barrack St.),

Telephone 857.

PERTH.

Buy your **SEEDS** for the Farm and Garden

FROM

WESTRALIA'S LEADING

SEEDSMEN and NURSERYMEN,

The ROSELEA NURSERY

(Opposite CHAS. MOORE & Co.)

677 HAY STREET, PERTH.

W. H. JONES, Proprietor.

H. W. NEWMAN, Manager.

Our New Catalogue Free on Application.

STEEL WINGS

Patented
throughout
the World.



Some Exclusive Features.

DOUBLE CRANKS,
DOUBLE SPOKES,
DOUBLE
BEARINGS,
DOUBLE POWER,
EVERLASTING
LIFE.

Send for

**Steel Wings
Pamphlet.**

Made in Western
Australia
and Sold with a
Guarantee.

**Steel Wings
Engineering
Co., Ltd.**

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HAY STREET.

GEORGE WILLS & Co.,

MURRAY STREET,
PERTH,



Have supplied
more than half
State's require-
ments for the
past 10 years.

Quality as high,
Price as Low
as ever. = -

DEERING
MACHINERY
AND
PRODUCE
AGENTS.

Chaff and Grain Auctioneers.

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Journal of the Department of Agriculture



WESTERN AUSTRALIA

MAY.

1909.

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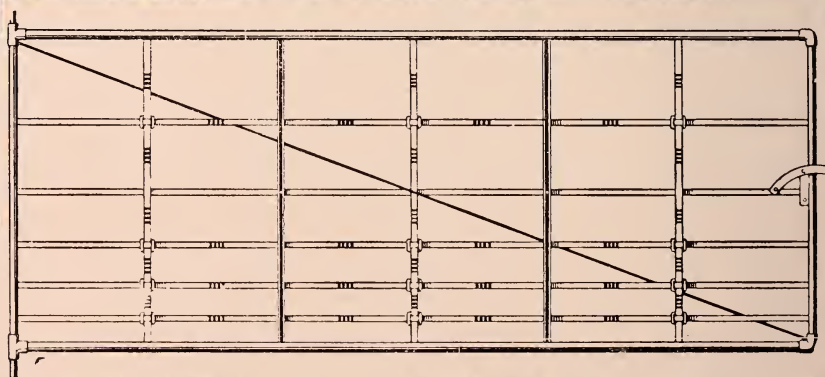
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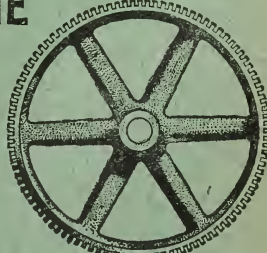
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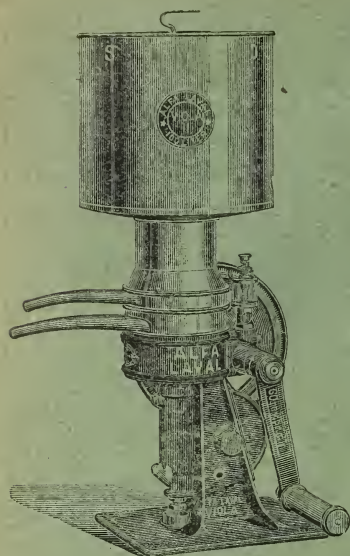
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MOUNT LYELL SUPERPHOSPHATES

HAVE PROVED BEST BY TEST. FARMERS BELIEVE THIS.

They are again placing Orders for Coming Season.

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(which repeals all prior Acts),

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- (a.) Purchase of Breeding Stock.
- (b.) Payment of existing liabilities where secured by registered mortgage.
- (c.) Effecting improvements on the security offered.

The maximum amount that may be advanced for the former purpose is £100, and advances for the purposes set forth in (a.) and (b.) are only made on the security of existing improvements.

The improvements recognised by the Act, and to effect which the Trustees are empowered to advance their fair estimated cost, are

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Interest at the rate of 5 per cent. per annum is payable half-yearly, and all Loans to effect improvements have a currency of 30 years, but may be repaid earlier at the option of the borrower.

Applications should be made on the Bank's forms, and forwarded, with a fee of 1 per cent. (exchange to be added to country cheques), to the Managing Trustee, from whom forms and full particulars may be obtained.

"WELL SOWN IS WELL GROWN."

**An ounce of Practice, as is well known,
Is worth a Ton of Theory.**

This being so, in describing the McCormick Grain and Fertilizer Drill, instead of taking up your time in telling you what WE think of the "McCormick" we leave you to read what the experience of responsible farmers has been with it.

They are the men who have the highest qualifications to speak for or against it, for to them its faults, if any, as well as its merits, must have made themselves apparent.

If you will give a careful reading to what they have to say about the "McCormick," you cannot but help being struck with the unanimity of their opinions as to the extreme satisfaction it has given them, and to their expressions of praise as to the way it excels in the carrying out of those particular functions which are essential to a good sowing, and on which the future of the crop to be grown depends.

Their experience has been that the "McCormick"

1. *Plants the seed a uniform depth,*
2. *Distributes it evenly,*
3. *Distributes the fertiliser regularly and in such a manner that every seed derives full benefit from it.*

They also state that the "McCormick"

1. *Is easy on the operator,*
2. *Easy on the team,*
3. *Is not troubled by sticky manure,*
4. *Works splendidly on rough ground, and*
5. *Does its work without breakages.*

We have on file numerous testimonials, which want of space precludes our giving in the advertisement. A line from you and we will furnish you with names and addresses of "McCormick" users in your own district, and our catalogue, which we post free.

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Buy your **SEEDS** for the Farm and Garden
FROM
WESTRALIA'S LEADING
SEEDSMEN and NURSERYMEN,
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(Opposite CHAS. MOORE & Co.)

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* * * * *

Advice to Applicants

* * * * *

❁ ❁ ❁

Intending clients of the Bank are requested to note the following directions, particularly with

regard to anticipating their requirements. By so doing much of the inconvenience from delays, which are at present unavoidable, may be obviated:—

DON'T DEFER making application until you are in financial difficulties. With ordinary foresight you should be able to anticipate your requirements by at least two or three months. If you are in any doubt as to being able to tide over the unproductive stages of development, put in an application before you start your improvements. If the request is a reasonable one you can confidently look for assistance, and, in the event of approval, the proposed work effected since date of application is paid for. It should be clearly borne in mind that the Bank does not pay against work done prior to that date.

As soon as you have lodged an application, see that the Leases or Occupation Certificate, as the case may be, of the security offered are in your possession, and ready for production when required. If these have not been issued you should apply at once to the Under Secretary for Lands.

Notices of Approval are not sufficient for the purpose of a mortgage.

No moneys can be paid over until a mortgage over the security offered has been completed. This is prepared free of charge and forwarded for signature as soon as an application has been approved in Executive Council, provided the security has in the meantime been completed, and a registration fee of 5s. paid on each Conditional Purchase or Homestead Farm block, with stamp duty of 2s. 6d. for each £50 of the amount of mortgage.

For further directions see page vii.

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Books for the Farmer.

<p>Principles of Agriculture (Bailey). Price, 6s. ; posted, 7s.</p> <p>Agricultural Note Book (McConnell). Price, 9s. ; posted, 9s. 3d.</p> <p>The Book of the Corn: A complete treatise on Maize Culture. Price, 9s. ; posted, 9s. 6d.</p> <p>Land Draining, Principles and Practice of Farm Draining (Miles). Price, 6s. ; posted, 6s. 6d.</p> <p>The Soil (King). Price, 8s. ; posted, 8s. 9d.</p> <p>The Soil: An introduction to the Study of the Growth of Crops (Hall). Price, 3s. 6d. ; posted, 4s.</p> <p>Irrigation and Drainage (King). Price, 8s. ; posted, 9s.</p>	<p>A Treatise on Manures (Griffiths). Price, 7s. 6d. ; posted, 8s.</p> <p>Fertilisers: The Source, Character, and Composition of Natural, Home-made, and Manufactured Fertilizers (Voorhees). Price, 6s. ; posted, 6s. 9d.</p> <p>Potatoes: How to Grow and Show them (Pink). Price, 2s. ; posted, 2s. 3d.</p> <p>The American Fruit Culturist (Thomas). Price, 12s. 6d. ; posted, 13s. 9d.</p> <p>The Principles of Fruit Growing (Bailey). Price, 6s. ; posted, 6s. 9d.</p> <p>Manures for Fruit and other Trees (Griffiths). Price, 9s. ; posted, 9s. 9d.</p> <p>The Spraying of Plants (Lodeman). Price, 5s. ; posted, 5s. 6d.</p>
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For Detailed and Stock Joinery, Architects and Builders can have no higher
guarantee for Sound Workmanship and Material than the

WHITTAKER BROS'. Brand on every Article.

Grasses and Forage Plants a Speciality.

New Seeds

1909
STOCK

For FLOWER & VEGETABLE
GARDENS

FARM SEEDS, New & Reliable

Rye Grasses, Cocksfoot
Mangolds, Swede
Rape, Lucerne
etc., etc.

ROSSITER & Co.

When
writing
mention this
Journal.

655

Hay St., PERTH

PASPALUM DILATATUM (Seed & Roots)
RHODES GRASS (Chloris Gayana),
Seed and Roots.

Paspalum Distichum (Water Couch)
Roots for Swampy Lands.

FRUIT TREES & GRAPE VINES

Extra Strong Well-rooted Vines.

Orders now being booked for 1909 Planting Season.

Phosphate Bags

Chaff Bags

Frozen Meat Wraps

Salt Bags

Made at
the
Fremantle
Factory.



Factories all
over the
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and
New Zealand.

AND ALL OTHER KINDS
OF BAGS AND SACKS.



JOYCE BROS., Limited,
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*Settlers and Others who contemplate Building will study their own
Interest best by securing*

**LYSAGHT'S "ORB" OR "REDCLIFFE"
GALVANISED IRON**

OF ENDURING BRITISH MANUFACTURE,

For ROOFING PURPOSES, as those brands have been tested on the World's Markets
for nearly 40 years, and have given UNIVERSAL SATISFACTION to users
both for ECONOMICAL reasons and perfect RELIABILITY as to
general uniform EXCELLENCE of Manufacture.

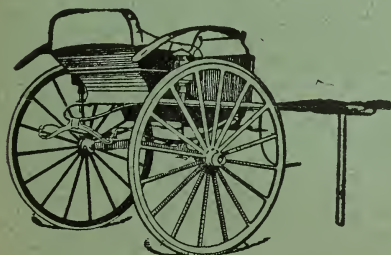
"QUEEN'S HEAD" FLAT IRON ranks first for making up purposes.

SPECIAL LARGE HEAVY SHEETS FOR TANKS AND VATS.

OBTAINABLE FROM IRON AND TIMBER MERCHANTS THROUGHOUT THE STATE.

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Buggies, Sulkies, and Business Carts of all
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Wheels fitted with Rubber Tyres.

Repairs, Painting and Trimming on the
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Only the best Workmanship. Bedrock Prices

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St. GEORGE'S TERRACE, PERTH.



THIS is a Boarding and Day College. The attendance, at present, numbers 86 Resident Boarders and 106 Day Scholars.

The Students are always under supervision. The Boarders are not allowed to leave the precincts of the College without special permission.

Sport in all its branches is encouraged. Specialists give lessons in Gymnastics, Boxing, Cricket, Football, and Rowing.

The very best Masters are secured for Piano, Violin, Cornet, and Vocal Music.

The supervision of the Dormitories is specially attended to.

Examination Results.

University Primary or Preliminary...	94	Passes
University Junior ...	114	"
University Senior ...	52	"
University Higher ...	40	"
University Honours ...	191	"
First Place in South and West Australia ...	9	Times
Second Place in South and West Australia ...	8	"
Third Place in South and West Australia ...	4	"

Money Prizes won by the Students.

19 University Prizes, amounting to ...	£	s.	d.
26 Government Exhibitions of £15 each ...	294	3	4
14 Government Exhibitions of £25 each ...	310	0	0
5 University Exhibitions of £50 each ...	350	0	0
1 University Exhibition of £225 ...	2,250	0	0
2 Rhodes Scholarships (£900 each) ...	225	0	0
	1,800	0	0
	£5,229	3	4

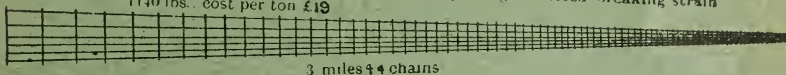
NOTE SPECIALLY that boys of all Denominations are admitted to the College. The religious opinions of every Student are scrupulously respected.

In writing for Prospectus kindly mention this Journal

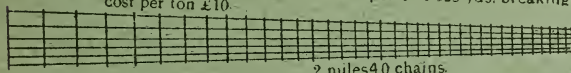
The Relative FENCING Value of

£25for 6 wire fences with **NEPTUNE UNRIVALLED PATENT STEEL WIRE**, 12½ and 14 gauges and ordinary galvanized wire 8 and 10 gauges

12½ g Neptune Unrivalled length per cwt. 1430 yds. guaranteed breaking strain 1140 lbs. cost per ton £19



8 gauge ordinary Galvanized wire length per cwt. 525 yds. breaking strain 1125 lbs. cost per ton £10



14 gauge Neptune Unrivalled (length 2240 yds. breaking strain 730 lbs. cost per ton £20) would give 5 miles 35 chains and 10 gauge ordinary wire (length 816 yds. breaking strain 720 lbs. cost per ton £10 10.) 3 miles 54 chains.

The above figures are based on Fremantle prices. The further the wire is hauled or carted the greater the comparative saving. Neptune Unrivalled does not sag or snap. Call and see it in the fence. Beware of Imitations.

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"Recently a tree fell across my fence (12½ g. Neptune Unrivalled Wire), taking all the wires right to the ground, the top wire splitting the two posts in 12ft. panel. I cut the tree away, and the wires sprang back to original position, humming like fiddle-strings, and I have not found it necessary to re-strain the wires. They are as taut now as when erected" (3 years ago).

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"I have done some 40 miles of fencing with your Neptune Unrivalled Wire during the past two years, and I do not intend to use any other while I can get it. I can confidently recommend it to all my friends."

PAGE'S DROPPERS.—Made of Special spring steel. Tongues punched to suit any fence. Light, easy to fix, will not burn. Distribute strain over all the wires. From 12s. per 100. Thousands in use throughout W.A.

IGEL BARB.—14-g. runs over ½ mile per coil: cheapest per mile. Costs 38s. per mile as against 46s. for ordinary 14-g. 12½ g. also stocked. Used on Government rabbit-proof fences. No split barbs.

NEPTUNE NETTING.—All 4in. Netting has 3-ply selvages and five twists of wire between meshes. Full gauge and weight, galvanised after made. Large stocks held. When you buy netting get the best.

We specialise in all Fencing
Specialities.

SEE US before arranging your
Fencing Contracts.

AGENTS FOR W.A.:

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47 KING ST., PERTH.

Quibell's Sheep Dip

— LIQUID AND POWDER —

USED ON THE MOST
FAMOUS FLOCKS IN
- - THE WORLD - -

Dalgety & Company, Limited

— AGENTS FOR AUSTRALIA —

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How to avoid it.

MESSRS. D. HYAM & SON, Jersey Farm, Nowra, Illawarra Dairying District, write:—

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"1,424 gallons milk in 52 weeks, which produced 845 lbs. butter.

"This result has appeared in the public press.

"We may tell you that when one of your representatives was round the country we were expressing our dissatisfaction at what we call rubbish put on the market as oil cake, and we only then discovered that the cake we complained about was not yours at all; yet we might easily have noticed that the cake was a different shape to yours.

"We will take care in future to notice that when we buy oil cake that the word 'Sunlight' is on every cake."

SUNLIGHT OIL CAKE increases the milk flow and butter fat.

Beware of the Dairy Danger of poor and adulterated fodder being substituted for **SUNLIGHT OIL CAKE**.

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Guaranteed Pure.

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"Sunlight Oil Cake: How to use it,"

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JOURNAL

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OF

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The HON. THE MINISTER OF AGRICULTURE.

PUBLISHED MONTHLY.

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NOTES.

A wash for Fowl-houses.—An exchange recommends a most efficient germ slayer, an ounce of carbolic acid added to a pail of whitewash. Give the walls and ceiling of the hen-house a good coating, working it in rather thick in all cracks and crevices.

Pig-Feeding.—Experiments in pig-feeding, to ascertain the best pork-producing ration, carried out under the supervision of the Wiltshire (Eng.) County Council proved that one gallon of skim milk or butter-milk and three pounds of potatoes or barley meal per pig were the best constituent food.

Polo-bred Horses.—*Live Stock Journal* says the mounted infantry horse of the future is undoubtedly the polo-bred animal. That fact is forced home every time the show of the Polo and Riding Pony Society is held at the Royal Agricultural Hall. Gradually breeders and critics alike are coming to the opinion that for all-round usefulness in times of war the polo-bred pony is difficult to beat. His nippiness, handy size, and weight-carrying abilities are undeniable.

Local manufacture of Bags and Sacks.—Every fresh industry opened up in this State is evidence of advancing prosperity, and deserves encouragement. This applies to Messrs. Joyce Bros.' factory at Fremantle, where are manufactured light and heavy bags and sacks for chaff, wheat, potatoes, and other products, which they supply in any quantity to farmers and others at lowest prices. The firm find employment for many hands, a fact that entitles them to the consideration of buyers.

Prevention of Sore Shoulders.—Take an ordinary sweat pad and cover the surface next to the shoulder with soft white oil-cloth. Be very careful to have it put on very smooth, without any wrinkles or lumps on its surface. The cover is put on by neatly sewing it with strong thread, so that it will not become displaced. The trouble with the horse's shoulders in this respect

is caused by sweating, and as oil-cloth presents a cool, dry surface, and does not hold the dampness as leather or cloth does, it prevents the shoulders from becoming sore in almost every instance. Renew the lining as soon as there is evidence of wear.—*Farmer and Grazier.*

Fruit Exhibition at Liverpool.—We have received a circular from Mr. Thomas Dowd, Fruiterer and Florist, 25 and 27 Moorfields, Liverpool, notifying his intention to hold an Exhibition of Home grown and Colonial fresh fruits in St. George's Hall, in that city, on September 13th to 17th. This he is doing at his own cost in the interests of the fruit industry, and undertakes to pay freight on exhibits. Australian growers who may desire to forward exhibits must select choice samples of fruits, which will be placed, on arrival, in cold storage by Mr. Dowd until the date of the exhibition, and every prominence given to the grower of every exhibit. Mr. Dowd is a member of the Liverpool City Council and Chamber of Commerce.

Perth Technical School.—The Education Department has issued the Time Tables, Scales of Fees, and General Class Regulations for 1909 of the Perth Technical School, in St. George's Terrace. A course of instruction in such branches of knowledge as chemistry and analysis, carpentry, blacksmithing, botany, geometry, etc., will be of great value to young men who have a predisposition for country life and settling on the soil, together with agricultural information or experience they possess or may acquire. Branches are established at Fremantle, Claremont, Midland Junction, Kalgoorlie, Boulder, Coolgardie, Menzies, and Day Dawn. Enquiries as to fees, terms, classes, etc., can be obtained on application to the Director, Mr. F. B. Allen, M.A., B.Sc., St. George's Terrace, Perth.

Australian Fencing Wires.—It is gratifying to learn that the well-known "Neptune Unrivalled" wire is increasing in favour with settlers in this State every month, and that the 12½ and 14 gauges are replacing the ordinary 8 and 10 gauges. Messrs. Malloch Bros., who are the agents for the "Neptune Unrivalled," state that this wire shows a saving of over 50 per cent. on Fremantle cost as against the cost of the other two gauges, and a difference of over 250 per cent. on transport charges. This is also said to be the case with "Igel" barbed wire of the same firm as against ordinary barbed wire, owing to its greater length per cwt.; and the fact that the barbs are short but sharp prevent mutilation of stock, also commends it to all our farmers who are fencing their holdings. [Advt.]

Cotton Cultivation at Geraldton.—The *Geraldton Express* says that Mr. W. R. Lowe, a member of that journal's staff, "has succeeded in proving that cotton will grow well even in sandy Geraldton. Last November Mr. Lowe sowed in a small garden attached to his residence some Sea Island seed, which he obtained from Mr. H. Allerton Cowper, formerly of this town, but now on the *Journal of Agriculture*, and the result has been most satisfactory. The seed shot well and the plants, which received very little attention, are now bearing, the bolls enclosing what appears to be excellent cotton, samples of which can be seen at this office. It will be remembered that Mr. Cowper started a cotton plantation near the mouth of the Chapman about three years ago, but owing to an unusually severe windstorm the crop was devastated."

Trial cultivations at Beagle Bay.—Father Joseph Bishop, Supervisor of the Beagle Bay Mission, in a report to the Under Secretary, dated 17th April, states that two trials have been made with jute seeds, which came on fairly well at first, but the hot weather destroyed all but a few of the young plants, those surviving being now in seed. Cotton seeds planted this year failed to germinate, and the American, Egyptian, and Queensland varieties did not give as good results as last year. The Superior concludes that irrigation is necessary in these cases to secure success. The Mission is giving more attention to sorghum, kaffir corn, Jerusalem corn, beans, cowpeas, peanuts, maize, watermelons, and pumpkins, all of which yield good results. Wheat and various kinds of coffee are being tried and seem to promise well.

Fruit Tree Catalogue.—We have received from the "Roselea" Nursery, 677 Hay street, Perth, a copy of their new Seed and Fruit Tree Manual for the 1909 season. In addition to the customary list of varieties of seeds and plants offered for sale, the publication also contains a large amount of useful information as to "what and when" to sow and plant various garden seeds, etc. The "Roselea" Nursery, although amongst the more recently established firms of seedsmen and nurserymen in this State, have succeeded in keeping themselves well before the public by carrying off numbers of first prizes at various exhibitions of garden and nursery produce held within the last two or three years. This fact was well exemplified at the recent Autumn show of the Royal Agricultural Society, when out of a total of 27 entries this enterprising firm carried off no less than 16 first and four second prizes. In rose-growing the "Roselea" Nursery have been exceptionally successful having gained as many as five championship prizes since the 1907 Royal Show. Included in their catalogue of roses are all the best of the more recently introduced novelties of this queen of flowers, and its perusal will well repay any interested grower.

The Orange Codlin Moth.—This pest, Orange Codlin Moth (*Enarmonica batrachopa*), is not in the catalogue of citrus growers in this State. It is found, however, in countries with which we have intercourse, and a little laxity of supervision at ports of entry may give it an introduction. Therefore, it will not be amiss to offer a little information regarding the pest on the principle that to be forewarned in its recognition is to be forearmed. It threatens to prove a serious trouble in Transvaal, and the following notes are culled from the annual report of the Entomologist of that State. The larvae can be found in oranges, naartjes, and lemons at almost any time of the year, and at the same time as when the moths are emerging. There are only two measures which can be adopted in the eradication of the pest: spraying seems out of the question as there is no definite seasonable life history, as is the case with the apple codlin moth. The affected fruit usually falls from the trees when the worm is nearly fully grown, which then crawls out and forms its cocoon on the under side of the fallen fruit, or under any refuse which may be present on the surface of the ground. All fallen fruit should, therefore, be promptly picked up and buried with at least a foot of earth covering it. The Natal Entomologist states that he has found this moth laying eggs upon guavas, so that there is a large range of fruits which it would attack in the absence of citrus fruits.

STOCK AND CROP RETURNS.

Mr. Malcolm A. C. Fraser, Government Statistician of Western Australia, has received the following reports from other districts in the State of the crops and live stock for this year, in addition to those published in the April number of the *Journal*:—

SOUTHERN DISTRICTS.

Pingelly.

Constable J. J. Jones reports:—"I respectfully report having completed the stock and crop returns for this district. The chief products are wheat, oats, and wool. The season has not been as bountiful as some in former years, the cause being prolonged dry weather and severe frosts. Good rains fell early in the season, and continued into the month of July; then followed a lengthened period of dry weather, accompanied by severe frosts, which rendered the land hard on the surface, causing the corn to wither. The good heavy lands suffered more than the light, the sandy nature of the latter resisting the binding influences of the frost. From July until harvest very dry weather was experienced, only a few light showers having fallen. The district all round shows an increase in wheat and oats compared with former years. A great quantity of clearing and ringbarking has also been done. The great difficulty which the wheatgrower has to face is the clearing of a sufficient quantity of his land to allow of his having fallow land for the ensuing season, thereby enabling him to commence sowing as soon as the first rains have fallen. The beginner or those in straightened circumstances are not usually in a position to do this, consequently, whilst the well-circumstanced farmer is sowing his fallow land, the less fortunate one is perhaps clearing land which he has also to plough and sow the same season. I noticed several crops hurried through in the manner described last season, and they were scarcely worth harvesting. In stock-raising, horses, sheep, and pigs are on the increase, but cattle do not at present appear to do well here, and there is little increase on former years. Farmers generally are realising the necessity of having some other product as well as grain, and are going in for small flocks of sheep. Clearing and cultivating renders this land of greater carrying capacity for grazing purposes, the grass obtaining a better hold on the cultivated land. Sheep do well here, and appear to be free from disease; the lambing was good. A few of the farmers in the hilly country west of Brookton have had some trouble with dingoes amongst their flocks, and have been obliged to wire-net holdings, which is expensive, but is a preventive. Stock generally are in good condition, although grass is not too plentiful. There is not much increase in poultry, although the birds are healthy throughout. Fruit is grown chiefly for home consumption, and the season has been good; nearly all varieties thrive here. Land settlement is gradually extending eastward beyond the rabbit-proof fence, but the holders are not so far producing, their energies being chiefly directed to fencing, ringbarking, and the conservation of water. The want of a good supply of water

has been keenly felt in Pingelly this summer, the townspeople depending solely on their roof catchments for their domestic supplies, and the stock supplies being derived from two wells in the town controlled by the Roads Board. Farmers carting produce depend exclusively upon these wells for the watering of their teams, and in the busy season when large quantities are drawn, the water becomes salty, and in consequence a good deal of sickness occurred amongst horses during the past season. A scheme is afoot for the construction of a reservoir or the extension of the goldfields scheme from Beverley to here, and whichever is decided upon it will be a great boon to town and district if it is completed and a plentiful supply of water available for the coming summer."

Kojonup.

Constable Begley writes:—"I respectfully report having completed the statistics for Kojonup district. Whilst collecting, the following localities were visited: Moradup, Gracefield, Gordon River, Balgarup River, Moodiarrup, Arthur River, Beaufort River, Cherrytree, Marleyup, Yarranup, and surrounding country of each locality. In consequence of the information received and observations made during my round, I am glad to be able to report very favourably on the progress made since I collected the returns last season. Large tracts of country have been selected during the past year; new homesteads erected, and thousands of acres have been ringbarked, cleared, and fenced. The new settlers who have arrived made no complaints, and they appear to be well pleased with their prospects. Many of the old settlers are building new homes, which show that they are prospering. Mixed farming is the chief industry through this district, and very good results have been obtained generally. The lambing has been a good one, but native dogs, frost, and poison are responsible for the many losses amongst sheep and lambs. Many of these losses would have been prevented if settlers had erected dog-proof fencing and seen that the poison was properly grubbed up before turning in the sheep. The wool clip has been a very good one, and has realised high prices. Horse-breeding is receiving attention, but before good results can be obtained a better class of stud animals will have to be introduced. Dairying is on the increase, and some splendid dairy cows have arrived from time to time. The grain crops have been affected by frost in some cases, in others exceptionally good results have been obtained. Wheat and oat hay is generally grown. The best crops by far have been obtained from land that has been fallowed. The fruit crop has been light, owing to the season, but nearly every kind of fruit grows well. Poultry farming is increasing; quite a number of farmers have done well, and diseases are few. Irrigation for cultivation purposes requires attention; it has been commenced in one instance this year with splendid results. While riding through the district I saw many sheep, cattle, and horses grazing; they had a healthy appearance and were in good condition. I beg to express my sincere thanks to the settlers of this district for their kind treatment, and the readiness to supply any information in connection with this particular duty."

Beverley.

Constable H. W. Wood writes:—"I respectfully report having to-day completed the collection of the crop and stock returns for the Beverley district, and results of observations and information obtained. I have, while

engaged in collecting the returns, formed the opinion that the past season, from an agricultural point of view, has been a fairly successful one. The wheat and oat yield for this district will be below the average for previous years, although in some instances the crops have reached from thirty to forty bushels per acre. The majority of these high averages, however, are from fallowed land and early sowings, as in other instances there have been some very low averages, which are attributable to the heavy frosts which were experienced in the latter part of the months of July and the beginning of August, and also for the want of the late rains, which were specially required by a few of the new settlers out far east, who were late in their sowing. The hay crop in this district has been exceptionally good. A sprinkling of farmers have cut as much as two tons per acre, and from information obtained the hay crops will quite reach the estimate given for this district. A scarcity of water is now being experienced by a few of the new settlers out far east, who only recently made their appearances on the land, but every effort to assist them is being made by the Government boring party now in that vicinity. As regards pastoral pursuits, there is a big increase in the number of stock since the last returns were taken. The horses, sheep, and cattle seen in the country traversed were all in excellent condition. The losses of stock were slight; only very few deaths have been recorded, and the majority of these were from old age and native dogs. The latter made their appearance during the lambing season, and were very destructive amongst a number of flocks. Since my collection of the returns last year I find that a large number of new settlers have selected land in this district, the majority of whom appear to be well satisfied with their prospects, and, taking it on the whole, I consider the Beverley district is in a flourishing condition."

Narrogin Sub-districts.

Constable F. B. Cunningham reports:—"I respectfully report for the information of the Government Statistician that I collected the stock and crop statistics for the year 1908 at the various places in the Narrogin sub-district, namely, Highbury, Narrogin, Fourteen-mile Brook, Dumburning, Popanyinning, Gillimunning, Yarling, Wickepin, Dorakin, Cuballing, and East Narrogin. The crops this year were not so good as usual, owing to the unseasonable rains and frosts. In most cases the best crops were obtained from fallow land and early sowing. There has been a wonderful increase of settlement in the Narrogin sub-district for the last twelve months, and the clearing of land, burning down, and ringbarking is progressing by thousands of acres, and there will be a very great extent of country under crop and in fallow this year, especially in the East Narrogin and Dorakin locality. This is without doubt fine agricultural and pastoral country, especially for sheep, lambs at the present time weighing from 45 to 50 pounds, and for a new settlement the fruit crop shows both quantity and quality. With a fair season the Narrogin sub-district for agricultural and pastoral pursuits must have a prosperous future. Recently the Narrogin-Wickepin railway line has been opened for traffic, which was a great boon to the settlers. A large number of settlers now state they can crop more extensively, being within easy access of the line. The settlers this season were put to a lot of inconvenience owing to shortage of water supply, but this has now been remedied, as the Government has put down a number of large dams, which were finished in January, 1909, and when filled by winter rains will hold water all the year.

A number of settlers in this district have also put down large dams and wells. There is still a large extent of good country open for selection east of the rabbit-proof fence. It is now very easy to gain access to this country, owing to a good supply of water in dams and wells. This is fine grass country, and the stock are increasing very fast in the Narrogin sub-district, especially sheep and horses."

EASTERN DISTRICTS.

Northam.

Constable J. F. Hamilton writes:—"I have to report the completion of the collection of the crop and stock returns for the Northam police district. The crops, on the whole, are of a fair average, but grass is very scarce. Stock are in good condition, and looking well, and have yielded a fair percentage of increase. No failure of crops was reported to me, the oat and hay production being slightly below the average."

York.

Constable S. D. Johns reporting on the York district, states:—"Having completed the collection of statistics, I respectfully submit report thereon. Horses: This item has received very careful attention from owners during the past season, and the improved quality all round is very noticeable, but more particularly in draught classes, and there are to be seen some very fine animals, both locally bred and imported. Cattle receive but scant attention in this district and beyond, cows being only kept for household requirements. While on this subject, however, I should like to mention one particular cow, of Ayrshire and Shorthorn breed, owned by the manager of one of the large estates. I am informed by him that the cow milked continuously for three years after her first calving, and during that time she produced milk and butter to the value of £151 7s. 4d., and her progeny was sold for £4. She then calved again, and has since been milking continuously for five years, and at the present time gives sufficient milk for a large household, and of excellent quality, too. This, I am sure, is easily a record for this district. Sheep appear to be up to the usual standard as regards numbers and quality, some splendid rams having been imported by some of the large landowners. Amongst lambs there was rather a high percentage of deaths, due chiefly to the frosts at the end of last winter. The wool clip was a very good average one, and prices obtained were very satisfactory in most instances. Pigs: Owing to the stringent regulations which have to be enforced in relation to outbreaks of swine fever, breeders of pigs do not now find it a paying proposition, and in many instances have reduced their stock considerably. Poultry receives only a fair amount of attention, as far as rearing for market goes, but most settlers keep sufficient for their own personal requirements. As regards cropping, the season which opened so promisingly ended in disappointment at least to most, and in disaster, I am sorry to say, to a few. Crops for grain, which in the early part of the season gave promise of very large yields, were in many instances partial failures, and in a few were complete failures, as the crops were too poor to either strip for grain or cut for hay, and owners turned their stock in on them. This, in the opinion of settlers, was due to the long succession of heavy frosts, and the season suddenly turning dry towards the close; although the rainfall was ample for

requirements it did not occur at the times when it was most needed, hence the failure. One holder stripped 400 bushels of oats from 10 acres, which, considering the nature of the season, is easily a record one. Hay crops turned out far ahead of expectations, though below the average of other seasons. Contrary to expectations and experience in some instances crops sown on fallow land did not yield nearly as heavily as crops grown on land ploughed up during the season; the reason for this is unexplainable, but still the fact remains. Irrigation is practically nil in this district, but some of the holders of town lots expressed their intention of cultivating small patches of green fodder during the coming season, and of irrigating with the water from the goldfields scheme, which is now reticulated through the town. Fruit generally does well in this district, but not much attention is paid to that industry alone, there being only seven orchardists here. A number of settlers have their small gardens and produce sufficient for their own wants. In conclusion, I would add that the farmers of the York district appear to be quite satisfied with their prospects, given a fairly good season; in proof of their belief they are clearing large areas ready for next season's ploughing. I could not help being struck with the up-to-dateness of some of the new settlers, who appear to believe in the maxim of what is worth doing is worth doing well. I would like to point out for the benefit of a few of the settlers that a more ready compliance on their part in the matter of supplying information per special books would greatly facilitate the work in connection with the collection of statistics."

Kellerberrin.

Constable Cahill writes:—"I respectfully report having completed the statistics in the Kellerberrin district and eastward to Walgoolan. The production of wheat and hay crops is considerably less than that of the previous year, owing to the scarcity of rain and continuous frosts at the end of the season, but notwithstanding the unfavourable conditions prevailing, some excellent hay crops were gathered off fallow land. Many new holdings have been taken up on both sides of the Eastern Goldfields line, and the work of clearing the land is being pushed on by a number of new settlers, who are looking forward to the extension of the railways from Quarading and Dowerin to connect at certain points with the goldfields line. There was a steady increase in stock, particularly horses, during the period under review."

Goomalling.

Constable S. Campbell writes:—"I respectfully report having collected the stock, crop, and industrial returns, 1908-1909, in the Goomalling sub-district, which includes Jurakine, Rossmore, Quelquelling, Uvarty, Carranadgyn, Walyormouring, Dowerin, Coweowing, Koombarkine, Ejanding, Rabbit-proof Fence, and Wongan Hills. The crop returns were very satisfactory throughout the district, and the same may be said with regard to stock, the production of which has been very substantial. The wool clip was very fair, being well up to the average in weight and quality. The country to the north, north-east, and north-west of Dowerin has been extensively opened up, and new settlers are arriving every month, and are ringbarking, clearing, and preparing their ground for the next cropping. Owing to the country the other side of the rabbit-proof fence becoming thickly populated the water at Nenin Well and Benjabeering Well has almost disappeared, on account of

the constant supply which the settlers require. In some instances settlers are carting water ten and twelve miles."

Meckering.

Constable A. J. Ford reports:—"I respectfully submit the agricultural statistics collected for the year 1908-9 in the Meckering district. During the past season the crops throughout this district averaged fair returns, and as a result the majority of the farmers are satisfied, especially when they consider the small rainfall, which did not fall to suit them. Several failures occurred, but in most cases they were the grower's fault through late planting, etc. A large amount of clearing is now in progress on new holdings, most of which will be cropped during the forthcoming season, whilst also a large amount of agricultural machinery is being brought to this district. Preparations for seeding and planting the coming season's crops are now being made by the farmers here. Feed is dry and scarce, in consequence of which most of the livestock in this district are in a poor condition."

Newcastle Sub-districts.

Constable S. Campbell writes:—"I respectfully report having completed the stock, crop, and industrial returns for 1908-1909 for the Newcastle sub-district, which includes Coondle, Bejoording, Bolgart, Byeen, Normans, Old Town, Jumperdine, Wongamine, Yarramong, and Jennacubbine. The crop returns were on a par with those of the previous year, and in a few instances failure of crops occurred, due to severe frost. The wool clip was very satisfactory. The production of stock shows about the same average as that of the previous year, although in a few cases owners have lost a good number of sheep through poison and dingoes. A decrease is noticeable in the fruit returns, more especially with regard to grapes, for quite a number of people are rooting up their vines and utilising the ground for wheat growing, owing to the unsatisfactory market for wine. The industrial returns show a great decrease in winemaking this last year."

METROPOLITAN DISTRICTS.

Kelmscott.

Constable McGree writes:—"I respectfully report having collected stock and crop returns in the Kelmscott sub-district. There is nothing special to note from last year's return. The district is admirably adapted for fruit-growing (all varieties), market gardens, and dairying. There are many promising young orchards. The rapid growth and appearance of trees show conclusively their suitability to the soil. The dairies generally are well kept, the cows being carefully selected and remarkably healthy. Cereal crops are not grown to any great extent. Poultry is on the increase, with several yards devoted exclusively to the industry."

Mundaring.

Report of Constable G. Gannon:—"I beg to report having collected the agricultural, pastoral, and industrial statistics for the Mundaring district. As the district includes Smith's Mill, Parkerville, Lion Mill, Sawyers' Valley, Helena River, Chidlow's Well, Wooroloo, Mahogany Creek, and Mundaring,

the collection of the statistics necessitated a considerable amount of travelling. The principal industries of the district in order of importance are horticulture and timber getting. The district is well adapted to fruit-growing, and the number of orchards continues steadily to increase. Almost all kinds of sub-tropical fruits are cultivated; prominence, however, is given to apples of export variety. A considerable quantity of fruit has been shipped to the London market during the year, and realised very satisfactory prices. Generally speaking, the orchards throughout the district are free from destructive pests. The vineyards throughout the Darling Ranges are increasing, and the local vignerons are kept busily engaged in executing the orders for their wines, so favourably commented on by expert judges. The greater portion of the district is unsuitable to the cultivation, except in a limited degree, of cereals. The number of head of stock does not materially alter. Nearly all cattle and horses kept in the district are hand-fed, owing to the prevalence throughout the district of noxious weeds, particularly 'York road' and 'Bloom' poisons. The number of poultry has decreased, the opinion arrived at by most interested persons being that poultry rearing does not pay except as an adjunct to a farm. The fine forests in the ranges, though supposed some years ago to have been depleted of their most useful timber, continue to give employment to a considerable number of sleeper-hewers and woodcutters. The settlements in the hills continue to increase in popularity as health resorts, and with a train service more suited to city commercial men, there is ample evidence that a considerable number of people who now visit these places at week-ends only would make their homes here."

Guildford

Report by Constable J. Hess:—"I beg to report having completed the statistical returns for the Guildford police district, which embraces Kalamunda, Heidelberg, Gooseberry Hill, Munday's Swamp, Beechboro, Caversham, West and Middle Swan, Warbrook, Bullsbrook, Guildford municipality, West and South Guildford, and Redcliffe. Fruit growing to a large extent is carried on in the district: in fact fruit forms its major product. The valleys in the Kalamunda and Heidelberg districts, enriched by the fertilising wash from the adjacent hills, are ideal spots for the growth of apples and oranges. The fruit-fly, which in the past years caused great loss and alarm to the growers, was fortunately very little in evidence this year. The supply of grapes was very heavy, and several hundred tons of this fruit were picked from West and Middle Swan. There are eight vegetable gardens in the district, aggregating about 50 acres, all worked and controlled by Chinese. They appear to do very well. It is extremely hard to obtain correct information for statistical purposes from these, as they view with that inherent suspicion so characteristic of the Celestial all questions put to them by the collector. There are three poultry farms in the district, carrying from three to four hundred fowls each. There has been no appreciable increase in settlement during the year."

Midland Junction District.

Constable W. T. Caldwell in his report states:—

"I beg to report having collected the agricultural, pastoral, and industrial statistics for the Midland Junction district. The district includes Darlington, Greenmount, Swan View, Bellevue, Red Hill, Middle Swan, Upper Swan, Chittering Brook, and Midland Junction. The chief industry

of the district is fruit-growing, the country being suitable for almost all kinds of fruit, especially grapes. I think I may safely state that grapes of the highest quality and equal to those grown in any part of the Commonwealth are grown on the Swan. Wines are not made to any extent in this district, but the quality of what is produced is of the highest class, as evidenced by the number of prizes taken at the past agricultural shows at Claremont. The grapes suffered considerably through the hot winds at the end of December last, badly sheltered vineyards being reduced to nearly half their original production in a few days. There was a marked difference in stone fruits this year, as compared with the 1907-8 returns, when the production was practically *nil*, this season the production being very good in nearly every case. The majority of orchardists are going in principally for apples, especially those kinds most suitable for export. Generally speaking, the orchards throughout the district are free from destructive pests. Hay crops on the Swan were much heavier this season than last, owing no doubt to the rainfall being less than last season. Cereals are practically not grown in this district, except perhaps a few acres for seed. The number of head of stock does not materially alter, the majority of settlers only keeping sufficient for private use on farms. Poultry are not reared to any extent, the majority of people only keeping a few for their own use, most people being of opinion they do not pay owing to disease and the high price of feed. Generally speaking, the production of the various crops, etc., is in advance of that for the past three or four seasons. As regards industrial establishments, brickyards are the chief industry outside the Government industries. These, generally speaking, have not had too bright a time during the past year, as owing no doubt to the depression in the building trade in Perth and suburbs there has been little demand for bricks."

MIDLAND DISTRICT.

Moora.

Constable J. Allis, reporting on the Moora district, writes:—"I respectfully report having completed collecting the stock and crop statistics, assisted by Constable Blythe, for the year 1908 and 1909. The work has been pretty heavy this year, owing to the large increase in holdings and to the fact of New Noreia Police Station having been closed and now included with Moora. The district as at present constituted embraces New Noreia, 36 miles from Moora, Cartabody 58, Wongan 55, Bandy's Farm 56, and Hill River 80 miles, and intervening country. The district generally is making great strides, and there are many thousands of acres of new land, cleared during the last year, in readiness for crop. The present return discloses an increase of 387 horses, 555 cattle, and 19,252 sheep. Notwithstanding the increased settlement, there is a decrease of nearly 4,000 fowls, occasioned probably more through inattention and lack of interest than any other cause. A great number of people, however, maintain that poultry-keeping is decidedly unprofitable. How this should be, especially in a farming district, I am at a loss to understand. The town itself and many parts of the district are infested with fowl tick, and I have seen very little of any determined attempt to combat the pest. In many parts of the district the scarcity of water is a great drawback, more particularly at Wongan, Coomberdale, and country adjacent to Cartabody."

EASTERN GOLDFIELDS.

Menzies.

Constable J. O'Connor writes—"I respectfully beg to report having collected the stock and crop returns, season 1908-9, for the Yundamindera sub-district. The principal places visited are Yundamindera, Yarri, Edjudina, Pingin, and Linden. The number of horses and cattle show a considerable increase during the year, while the number of sheep showed little alteration. The country generally would appear to be much more suitable for breeding horses and cattle than it is for sheep, owing to the scarcity of grass during the summer months. At the same time sheep thrive remarkably well when they are cared for, especially in saltbush country. Dingoes are very numerous at times throughout the district, and consequently sheep have to be watched during the day, and yarded at night, to protect them from these pests. Last year was about the driest experienced for some time, but the drought had little effect on the horses and cattle, as the mulga and other scrub, which is plentiful, makes splendid feed. Good water is easily obtained in most parts of the district by sinking, the depth varying from 40 to 100 feet. There is very little cultivation done, owing to the dryness of the climate, but where windmills are erected and a liberal supply of water allowed to gardens, fruit and vegetables grow splendidly, as has been demonstrated at both the Yarri and Pindinni Stations. Apricots, lemons, and oranges especially grow remarkably well. Disease among stock is practically unknown, and consequently very few losses were recorded during the year. On one station, however, about 200 fat sheep died in one day, owing to overdriving them to water when the temperature was about 114 degrees in the shade. Poultry-breeding is not carried on to any great extent, although most people keep just enough fowls for their own use; it is not a profitable industry, owing to the high price of wheat and other poultry feed, none of which is grown in the district. The rabbits a couple of years ago did a considerable amount of damage to the few gardens at that time in the district, but since then the rodents have decreased, and now very few of them are to be seen."

To this report Constable J. G. Lynch adds:—"Whilst patrolling the Yundamindera district recently I was informed that stock, both cattle and horses, are on the increase, and that there have been very few losses. The country between Yundamindera and Pingin at present has very little grass. The stock mostly live on mulga, salt, and cotton bush, and generally appear to do remarkably well. I understand the rainfall for the last 12 months has been slightly below the average."

NORTH-WESTERN.

Gascoyne.

Constable L. Buck reports:—"I respectfully report leaving station on January 10, for the purpose of collecting statistics in the Minilya, Lower Gascoyne, and Wooramel districts. I found feed very scarce, which is usually the case at this time of the year; nevertheless, the fertility of the soil is very good. The rainfall has been up to all expectation, and I feel quite confident that the station owners are in for a good time. Stock is considerably on the increase; it will readily be seen by the returns already sent that the past season has been good. At Minilya and Yanyearreddy Stations I was weather-

bound for several days, owing to the heavy rainfall, and exceptionally high floods, which caused great damage to the station fences and windmills."

Constable F. C. Gray writes:—"Leaving the Gascoyne I visited Lower Clifton Downs, Dairy Creek Junction, Glenburg, Dalgety Downs, and Upper Clifton Downs Stations. I found the feed fairly good, through to the last-named stations. The condition of the country is undoubtedly good. The rainfall has been up to all expectations, and I feel quite confident that the station owners are in for a good time. Stock is considerably on the increase, which will make itself manifest in the next year's returns. It will be readily seen by the returns already compiled that the past season has been good. At Mt. Clere Station I was weather-bound for 10 days, owing chiefly to the heavy rainfall. Anywhere on the Gascoyne, after a heavy rain, the country becomes very boggy, and consequently one is unable to travel; it would bog a duck, let alone a horse. I crossed over to Mt. Augustus, where they have something like 10,000 head of cattle, and the country looks exceedingly well. Passing down the Lyons River to the junction, I visited Mt. Phillips, The Gifford, Minnie Creek, Onslow Creek, Arthur River, Mt. Sandiman, and Lyons River Stations. At none of the foregoing stations did I hear a single complaint concerning the condition of the country which they hold, or their stock. This, as you will observe, sounds good indeed for the settlers. Anywhere on the Lyons River, or places which I traversed, you could mow the grass with a scythe. During the trip which occupied something like seven weeks, I travelled over 600 miles."

Ashburton.

Constable J. Fogarty, reporting on the Onslow district, writes:—"The rainfall was above the annual average. Stock in general could not possibly look better than they did at the time I was engaged travelling on the statistical work. Feed and water were in abundance everywhere. The only drawback that I am aware of was that the rains on the Ashburton came too late for the growth of wool, consequently the wool clip was a little lighter on the Ashburton this year than in previous years, but this has not been the case throughout the whole of my district; for instance, on the Yanrey River there were early summer rains, consequently the wool clip was even better than in previous years. Machine shearing has been introduced, there being already two of the principal stations on the Yanrey River fitted with machine-shearing appliances. A new machine-shearing shed had just been completed at the commencement of last shearing on one station. This shed is said by experts to be the best in the State, and second to none in the Commonwealth so far as structural appearance and appliances are concerned, although there may be—and no doubt are—larger buildings of the kind in the other States. Whilst I was travelling last January in connection with this work a severe storm occurred, which caused considerable loss to station-owners by blowing down their windmills and damaging buildings, one station-owner alone having as many as nine windmills wrecked or nearly wrecked. Dingoes and other vermin do not trouble pastoralists in this district, with one or two exceptions, and then on so small a scale as hardly to be worth mentioning. Agriculture is unknown in this district. A few of the stations cultivate small gardens and grow a few vegetables for table use. Fruit trees of any description are not to be met with either. Mining was at a standstill at the time I was collecting statistics this year, but has since revived, and is progressing

a little. This time last year this industry was brisk in the locality, the minerals mined being principally lead and copper. It can safely be predicted that the end of the present year will show a marked increase in all the usual pastoral productions of this district, as we have already exceeded our annual average rainfall by a little over six inches."

Port Hedland.

Constable R. G. Skeet reports:—

"I have to report that the collection of agricultural and pastoral statistics for this police district is now completed. The following stations were visited:—Pardoo, De Grey, Strelley, Carlindie, Walerine, Indee, Abydos, Portree, Boodarie, and Pippingarra. All these stations except Abydos are principally engaged in the production of wool. Merinos are the only class of sheep here, and most of the stations are yearly improving their flocks by the importation of high-class rams from South Australia and other places. Last year, 1908, the clip on most of these stations was not up to the average, owing to scarcity of rain in the early part of the season. This year, however, promises fair to yield an excellent clip, owing to good winter and fair summer rains. The lambing last year was also somewhat below the average. Lalla Rookh, Walerine, and Indee stations are heavy losers through dingoes, although they are making every effort to exterminate the pest. Most of the stations have good vegetable gardens, and do not experience much difficulty in growing the more common varieties. Cattle are only raised to supply the local demand. Horses: De Grey station is going in extensively for a good class of hack and half Suffolk Punch draughts, having recently improved their stud by the importations of two thoroughbred stallions and one Suffolk Punch. Fair water is obtainable at an average depth of 35ft. to 40ft. In the course of my round I received every help and kindness from the various station-owners and managers."

Marble Bar.

The following report is by Constable C. R. Thompson:—"This district did not fare too well last season in the way of rainfall. The whole of the station-owners say that an abundant fall of rain is greatly required. There is a fair amount of surface water about, especially on the De Grey River, and feed right through is fair. It is to be regretted, however, that the feed (grass and spinifex) does not last very long without rain owing to the excessive heat, an insufficient rainfall being the greatest drawback the station-owners have to contend against. On the whole the stock is looking well throughout. Several station-owners explain that the high percentage of loss of live stock, especially lambs, was due to heat. The rainfall in this portion of the State is apparently often very local—that is to say one station may get an inch, whilst another two miles away would get no rain at all. The country is very uniform in its stock-carrying capabilities right through, and several new stations are being established which, with a good season or two, should do remarkably well. There is no great increase or decrease in the stock returns, as this depends almost entirely on the seasons."

Corporal Street adds:—"The station-owners anticipate having this season a very good lambing. We have had a very peculiar season, the rains having all been local. With the exception of the country in the vicinity of Coruna

Downs, which, unfortunately, the rains missed, and where in consequence a scarcity of feed was experienced, the other stations at one time or other had a fair rainfall and good feed. At Marble Bar the rain came very early, and we had early spinifex; but this, unfortunately, dries off very quickly. The present season, I think, will show up well for stock."

HOW TO CLEAR THE BUSH.

USEFUL HINTS FOR NEW SETTLERS.

(By A.B.)

With the object of bringing under notice the clearing of our heavily timbered lands, I am writing on the most economical and advantageous way of clearing this class of land. The class of country referred to is the karri lands at Torbay and Denmark, and running for hundreds of miles on the south and west coasts of the State. The land is good and rainfall heavy—from 32 to 40 inches—consequently the trees are tall and the scrub likewise heavy. At some places the land carries all karri, at other places it is mixed with red gum, at others it is about half and half. Again, in other spots, it is all red gum (this is flatter land, as a rule), with a little jarrah on the edges when the land thins out into poorer quality. Which is the best quality land I will not here discuss except to state that the karri land is much softer on the surface than the red gum. The trunk of a karri will at times bury itself up to two or three feet in soil in falling. The karri grows on the more hilly ground. The soil is of various shades of red, with sometimes a patch of the inevitable sand mixed in it. The height of the trees is from 100 to 250 feet and over, and up to seven or eight feet, and sometimes more, in diameter. Red gum is about 10 to 15 per cent. smaller all round. The number of trees varies from 15 to 30 to the acre above two feet in diameter, besides a variable number of saplings under that. The undergrowth is wattle and hazel and other scrubs. The hazel generally grows on the karri soils only.

Method of Clearing.

Like the lighter-timbered lands it has been found best to burn it down (not grub it), the first preliminary operation being ring-barking, which costs from 2s. to 4s. an acre. When the trees are dead, run a fire through on a favourable day in March. It is important to see that trees are properly ringed and dead, and that the fire runs well through it, otherwise it may add to the cost of clearing to the tune of a pound or even more an acre. The next operation is digging out the earth around the trees, about two feet wide and 15 inches deep, just the same as if you were going to grub them—taking care that the lowest part of the trench is next the butt of the tree, so that

the fire will roll in towards the butt when burning. The trenches around trees in land of a sandy nature will require to be a little wider and deeper, as the sand in the soil causes it to run when hot with fire and prevents fire burning down deep enough for cultivation. Small saplings up to about eighteen inches in diameter are, as a rule, best grubbed out right away, and all scrub roots mattocked up and left to dry. This earth work is best done in winter, when the ground is soft, and it gives the roots of trees a chance to dry ready for burning in summer. Things are now ready to start burning, which is best from January to April. If there are enough saplings, cut them up in handy lengths along with any dead wood that is lying down (about six feet lengths) and place several pieces alongside each tree to be burned down, according to size. A crosscut saw is best for this, if one of the two workmen knows how to keep it in good nick. If not, use two good, light and sharp axes. Having got the wood cut for about 50 trees,

Start Firing.

Take two pieces of this wood, say 12 inches in diameter and six feet long, put them end on into the trench at the butt of the tree to be burned (chipping the bark of the tree if required), keeping the outer ends wide apart, V-shaped. An old shovel full of hot coals, and a little rubbish where the ends of logs touch the tree starts the fire going. With two men, after starting about 50 trees going in this way, it will be time to go round with a light, chisel-pointed crowbar, and prod the charcoal off a bit (not too much) from the trees when burning. Don't knock the charcoal off the logs, but simply push them up tight to the tree, keeping the outer ends apart, the object being to burn the tree, not the logs. With a large tree it is best at times to have two or even three fires going at once; disconnected of course. As these pieces of wood burn away, put others in their place. It will be found best sometimes to save the heavier and more solid of the logs until the heat of the fire has got well into the stump of the tree and the ground. In the intervals of going round the fires get the wood ready and set other trees going, which are got under way as the others need less attention. The impression made on the trees for the first day or two will be small; it will appear to the new beginner a slow and rather stupid way of grubbing. Wait a bit, it is the number of fires going at once that tells. After about the second night you won't find so many trees with fires gone out when you come in the morning. Things are getting warmed up, and the fire begins to eat in better. It takes about five or six days on the average, to burn down a solid tree. A hollow-butted tree, if the wood is packed inside and out, will (after a preliminary light fire) burn down in a day and night even when the trunk is 6ft. or 7ft. in diameter. After the trees fall (if get-at-able) keep the remaining portion of the stump burning until it is at least a foot below the surface of the ground. It is important to do this now, as the fire is going, and heat is already in the ground. The writer has seen stumps go on burning on their own after being left, four or five feet down in the clayey subsoil.

Note.—Do not go amongst the standing burning timber at night putting fires together. Most trees fall at night, and they have a way of coming down without giving any warning at all. The cracking, creaking, warning note is absent on account of the heat in the fibres of the wood. There is plenty of time for night-firing when the trees are all down.

Time Taken.

For two men the length of time taken to burn down 10 acres with an average of 25 trees over two feet in diameter to the acre should be (when earth work is first done) four weeks, Sunday excepted. The writer and a mate tackled a patch this size several years ago (his first attempt). He asked a West Australian—from whom he got the hints of procedure—how long he should take to do it; he said four weeks. Well, we took five, but after experience gained, reckoned four were enough in dry weather. After the trees are burned down the next performance is burning them up. This is done by cross-burning the trees into workable lengths for rolling together. Cut lengths of limbs, saplings, or other handy wood, to size that two men can handle. It does not matter how long they are. Throw these across the trees at intervals, where they are to be cut in two with fire. A shovel full of hot coals where the stick crosses the tree and there you are. Get about a hundred going, and periodically visit them with a bar, prodding the charcoal on the tree (not the cross-burning stick). You are burning the tree, not the stick. Handy-sized wood is sometimes scarce. The stick will burn in two, and one end falls on the ground each side. Keep lifting these ends up on the tree trunk as they burn away, and when finished replace with others, if required; but not two pieces together on one side, unless you want to get rid of your handy wood to no purpose. After the cross-burners have eaten in about one-third they will not want so much attention. Two men in dry weather should have no difficulty in keeping 100 to 200 cross-burners going, and getting others ready, or heaping up logs already burnt in two in the meantime. Root running and hole filling goes on in the intervals as the logs are burned off.

Note.—When cross-burning it is as well to cut trees and limbs with the fire at bends and knots and forks, to make straight logs to roll. Should the timber be all large, without enough saplings and deadwood on the ground to start burning down the trees with—this would likely be cheaper clearing—start on the uphill side of the ground, choosing a spot where most handy timber is to be got. After burning down a few trees carry on the burning down and cross-burning, etc., simultaneously. In this case it will be found best to cross-burn sections of a tree (five feet in diameter, if you like) about four feet to eight feet in length, the shorter the better. Roll one of these pieces down hill against the butt of a tree to be burned down after a light fire has been going a while in the trench, and that will about see that tree down, and perhaps have enough left to burn the remains of the stump out, too, without having to get another piece. To do this work properly (for two men) you should have two of Trewallah Bros.' lever jacks—called timber or "kangaroo" jacks at the sawmills. The largest size, called "The Wallaby," is the best for this work. They are all metal, and if kept oiled, last for years. They will easily shift a log that a team of six horses wouldn't shift if they could get at it. Grubbing machines are no good for this class of clearing. The writer has worked machines that would easily pull down trees three or four feet in diameter without cutting a root in a very short time. Then it would take a man a couple of hours to pick the clay off the roots. You still have to burn the stump, the only difference being it is generally in a more awkward position. From a farmer's point of view, a grubbing machine is out of court, as it brings too much subsoil clay to the surface. The burning-down method improves the ground, the tree-puller is just the reverse. Dynamite is very useful, especially when timber is solid, and where sawmillers have left a few stumps.

A few plugs of dynamite in a solid stump will hurry things up a bit and economise wood and time if handy wood is scarce just at that spot. If, however, handy wood is plentiful, nothing is gained, as you can feed the wood in a little at a time, as required, and all round the stump, and get on with other work, so saving time that would be taken up boring holes, also the cost of explosives.

Burning Qualities of Timber.

Karri is a good quick-burning timber, and while the wood is kept close together, will burn well and quickly, but when logs get about two inches apart, the fire will go out if not attended to, especially when fires are first started. Red gum is a good, slow-burning timber. If two logs get to six inches apart, they will often still be alight. Occasionally a red gum will burn end on like a cigar. This will mostly happen with a sound tree. The writer has seen a red gum five feet in diameter burning for six weeks by itself like a cigar. In that time it had scarcely got 40 feet. The tree was solid, and rather a bad one to burn down, too.

If you roll a karri log five feet in diameter down hill on to a red gum two feet in diameter the same length, after the fire has been lit and the red gum has eaten its way into the karri far enough that the karri will roll of its own accord towards the red gum, you can say "good-bye" to both, and get to work on another, they will keep alight and see one another to ashes. Jarrah, although an excellent timber for making blacksmiths' charcoal, is not near so good a burning timber as red gum or karri, but as it is generally—in the good ground—well mixed amongst red gum, it is easily got rid of.

The price for this class of clearing is (after the timber is dead) about £8 an acre. It must be clearly understood that the writer is dealing with clearing outright all timber, stump, and roots that are on the ground to a depth of 10 to 12 inches, and filling in all holes ready for the plough. Partial clearing, leaving a few stumps and trees could be done much cheaper; £4 an acre would make a fair job of it, but it is open to question whether it is not best to clear right out from the start. For an orchard at least this is best. The general opinion is it is best and cheapest in the long run to clear outright if at all possible.

Karri forest, where it is all karri, if it was cleared immediately the saw-mills cut the sound timber out, could be cleared for from 10 to 30 per cent. less than virgin forest. If left long enough, however, after the timber is cut, it reverts back to be as bad as virgin forest or worse.

Hints and Short Cuts.

In clearing this sort of country knack and experience count for much. Always get Nature to aid you. It costs money and muscle to work against Nature. Do your digging when the ground is soft in winter, burn when the timber and the ground are dry, and in the summer roll your logs down hill, and when they are off the ground for a start put a spar under, then when cross-burnt they will roll better. Don't burn all your handy wood out of the road at first; you can always get rid of that. Sometimes you will get a green stump to burn. It will then be found best, after having had a hot fire going all round it, to let it have a rest for a week or fortnight, if possible, to give the flow of sap time to stop and dry back a bit.

The writer once saw a piece of clearing done in the winter. The timber was only half dead. There were four men at it (day work) with a good grub-



Gall-worm, or Eel-worm, of Potato.

bing machine to help them. The owner admitted it cost him over £40 an acre. It could easily have been let for £8 an acre when the timber was dead, if burning was done in the summer.

Value of Brains and Experience.

One more illustration. Two large trees, say six feet in diameter, are burnt down across the slope of a hill. They have crossed one another about 30ft. up. The butt ends are about 25ft. apart, V-shape. One man gets to work and cross-burns them where they cross one another. When they are burnt in two he gets his mate, and the two of them get their jacks and try to put the ends together, but fail: they then cross-burn the top one again, and then manage it. A second man goes to work at it: he gets his mate, and with the two jacks they roll the log on a sapling, placed in such a position that it will pivot round when on the sapling, and so come parallel with the other, as it rolls down the hill close up to the other log. A third man, from the log-yard of a timber mill, goes to work at the same job. Before cross-burning, however, he gets the sapling under the log, as it is already off the ground. When it burns in two it falls on the sapling, and he has it on the pivot, so that a shove with the bar, or perhaps a light lift with the jack sends it up against the other log with a bang that brings his mate along "to see who's hurt," just in time to help him up with a spar on the top of the two logs on a bit of rubbish, and a few hot coals.

GALL-WORM OR EEL-WORM OF POTATOES.

Mr. Arthur M. Lea, F.E.S., etc., Government Entomologist of Tasmania, states that the gall-worm or eel-worm is frequently confused with scab, and is often seen on scabby potatoes. It, however, causes rounded swellings, varying from the size of the head of a pin to the size of a pea, and occasionally even larger. The swellings may occur all over the potato, or on one side or one end only, and singly or in clusters. The disease is caused by an exceedingly small nematode or thread-worm of the genus *Tylenchus*, which, when it penetrates the potato, is too small to be seen by the naked eye.

All classes of land are liable to be attacked, but it is generally worst in fairly wet ground.

The following is an extract from a report on Diseases and Insect Pests of the Potato, by Professor T. W. Kirk, F.L.S., etc., of the New Zealand Department of Agriculture:—

Eel-worms.

An account of the potato eel-worm (*Tylenchus devastatrix*) was given in my 1903 report, in which it was stated that the pest was not common as a potato disease. In subsequent years, however, it has caused a considerable amount of damage, especially in paddocks that have been heavily manured.

Its presence is easily detected, affected potatoes being covered with wart-like growths. If a thin section of one of these growths be examined under a microscope whitish masses will be seen embedded in the tissues. These white masses represent female worms which have become much distended through the number of eggs within them.

Life history.—The adult eel-worm is about $1/25$ inches long, and in shape resembles a tiny eel, being pointed at both ends. Within the gullet is a sharp, spear-shaped body, which is used for piercing the tissues of the plants and extracting their juices. The young worms are developed from eggs, and in external appearance resemble the adult, only they are about one-seventh of the size. When the tissues of the affected plants decay, the young worms either fall into the ground, or the eggs and young worms remain in the decaying and dead parts, and become dried up with them. These eggs and young worms can withstand long periods of desiccation, and can, given suitable conditions, resume normal activities even after three or more years. This faculty makes the spread of eel-worms an easy matter, and must be carefully considered when advocating any special line of treatment. Another point which must be borne in mind is that the potato eel-worm is not restricted to the potato plant, but also feeds on numerous others, notably wheat, oats, hops, clover, and onions.

Treatment.—Treatment is exceedingly difficult, but the following points should be attended to:—

1. A rotation should be selected that will allow as long a space as possible to elapse between the growth of two crops that are known to be liable to infestation.
2. As far as possible, the refuse of affected crops should be destroyed. This is most economically done by composting with lime.
3. Affected potatoes should never be used for planting purposes.
4. Deep ploughing has been shown to be very beneficial to eel-worm infested ground.
5. Special attention should be paid to manuring. Kainit and Sulphate of Potash have been found to retard eel-worms.
6. A good method of dealing with the pest is to sow a trap crop of beet. The bulk of the worms will attack this, and the crop should then be pulled up and destroyed before the eel-worms have bred and again escaped into the soil.

FRUIT-DRYING FOR BEGINNERS.

(By GEO. QUINN, Horticultural Instructor, South Australia.)

PART I.

Owing to the great number of new orchards which are now coming into bearing, carrying in some instances this season heavy crops of certain kinds of fruits, the outlook for which in the local fresh-fruit market is not too bright, a few notes on the method adopted by some up-to-date driers of fruit may be acceptable.

THE PRINCIPLE.

The general principle involved in fruit-drying is the evaporation by heat—whether obtained from the sun direct or from fire—of the natural moisture of the fruit. By this process the pulp is brought to such a consistency that the small volume of moisture remaining in it is not sufficient to enable those lower forms of life whose special function it is to decompose such organic substances pursuing active operations. Sometimes various chemicals which possess antiseptic powers are used to assist in this process of preservation. Fortunately those in common use, when applied in moderation, are not particularly harmful to the digestive organs of the consumer.

THE OUTFIT.

For those about to begin drying fruit in the sun the outfit required is not complicated and need not prove very expensive. The first consideration is the trays upon which the fruit rests. For such fruits as raisins, plums, and prunes a dipping-tank and dipping-baskets are needed. For the proper curing of commercial samples of apples, pears, apricots, peaches, and light plums a sulphuring-box or -house is essential.

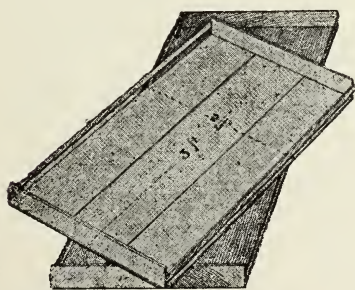


Fig. 1.

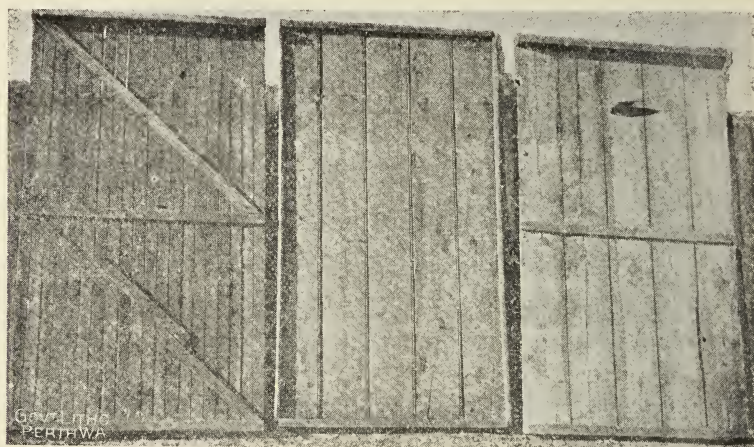
The Drying-trays.

Although trays of various shapes and sizes are used to a limited extent by individuals here, there are two popular sizes in general use in Australia. One of these, which has been introduced from California, is shown in Fig. 1. It is used almost exclusively on the irrigation settle-

ments along the River Murray, but seldom in the other districts of this State. Its measurements are 3ft. by 2ft.; the bottom consists of three boards, each 8in. in width and $\frac{1}{3}$ rd in. thick, tongued and grooved; the ends, which are from $1\frac{1}{2}$ in. to $2\frac{1}{2}$ in. high, are made of $\frac{7}{8}$ in. oregon pine. The three boards are nailed on to these, using 2in. flat-headed wire nails, four to each end of every board. Along each side runs a small deal lath, $1\frac{1}{2}$ in. wide, which is nailed to the ends of the end-pieces or "cleats," as they are popularly called.

These trays are light, neat, and readily handled by one man, but some driers object to them as proving more expensive to construct, and where a number of men are employed they contend that no gain from rapidity of handling is experienced. These cost 1s. each, made up in Adelaide.

The larger type of drying-tray suggested by A in Fig. 2 is 4ft. 6in. long by 2ft. 3in. wide. It is made in two forms: The first consists of the usual end-cleats, $2\frac{1}{4}$ in high by $1\frac{1}{4}$ in. thick, upon which are nailed ordinary $1\frac{1}{2}$ in.



A.

Fig. 2.

B.

wide oregon laths, 2in. thin wire nails being used. Practically only enough space is left between these laths to permit the passage of a knife-blade. Upon the under side, as seen in our illustration, three cross laths and two diagonal ones are now nailed so as to give strength to the structure, the middle one being of joiners' deal $\frac{1}{2}$ in. thick. To prevent the fruit falling off a side piece of deal, $\frac{3}{4}$ in. by 1in., is required along each margin on the upper surface of this tray. It is said these trays do not warp, twist, or hold the damp as long as boards, but against this they do not offer the smooth-planed continuous surface so necessary to the production of a fine sample of flat, smooth halves of apricots, peaches, or pears. These cost in Adelaide 1s. 7d. each made up. The other form is made exactly like the 3 x 2 tray, only that its dimensions are 4ft. 6in. by 2ft. 3in., and smoothly planed, tongued, and grooved matchboards are used in forming the bottom. This is a good tray for general purposes, requiring two men to stack when filled with fruit. Its local cost is 2s. made up. Another tray, 4ft. 6in. long by 2ft. 3in. wide, made of three boards each 9in. wide, neither planed smooth nor joined by tongues and grooves, which is suitable for currants and raisins only, can be procured locally for 1s. 5d. each.

Dipping-tank or Bath.

This is used so that the plums and the grapes for making loose raisins may be dipped in a hot solution of lye, the caustic action of which causes minute cracks to open all over the surface. Through these the moisture escapes much more rapidly than if dipping be omitted. The shortened period of exposure required for drying dipped fruits results in a brighter-

coloured product and a lessened possibility of insect-infection taking place.

In Fig. 3 is a rough sketch of a permanent type of dipping-tank which is in use here in sizes varying from 2ft. 6in. x 1ft 6in. x 1ft. 9in., to receive ordinary dipping-baskets, up to 5ft. x 3ft. x 9in., to accommodate the large-size trays previously described.

Anyone who is possessed of a 12-gallon domestic washing-copper need not at the

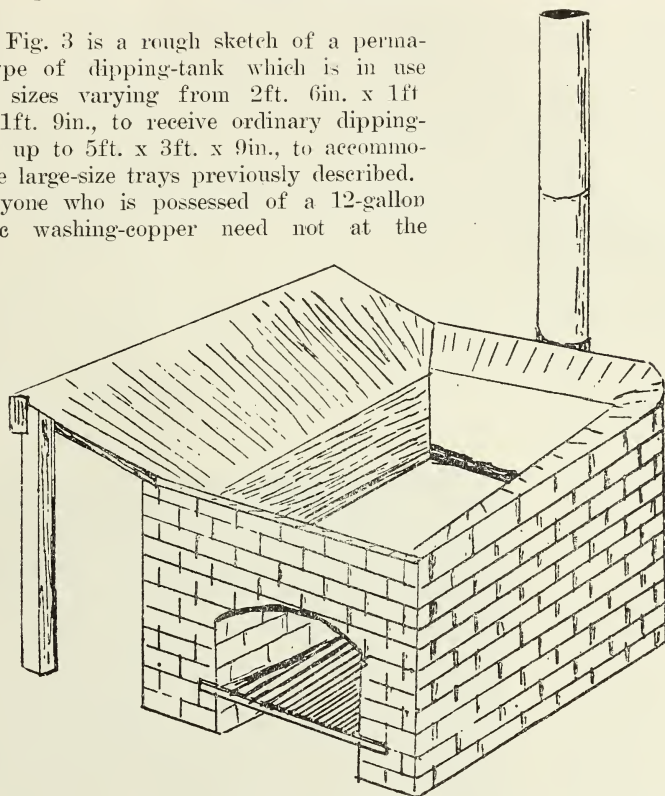


Fig. 3.

outset look for any other form of dipping-tank, if only a ton or two of fruit has to be treated. By manipulating a sheet of tin or galvanized iron a draining-table may be rigged against the copper-stand by any handy man. Whatever form of material is used—galvanized iron is usually adopted, though some use very expensive but more durable copper tanks—the firing arrangements should have ample space, and be well under control. Large dips are most effectively heated by steam-power, if such be available.

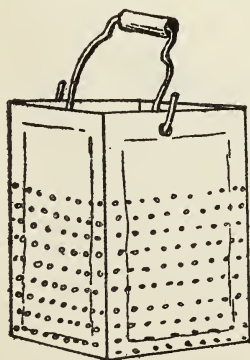


Fig. 4.

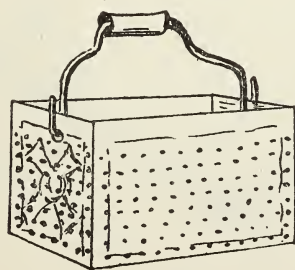


Fig. 5.

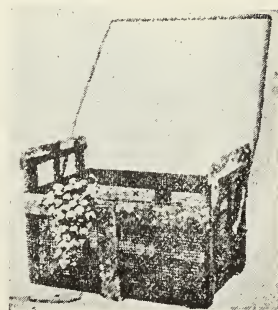


Fig. 6.

Dipping-baskets.

Some of our large establishments pick or spread the fruit on the trays, and dip the trayful at one operation. This, however, is not generally adopted. For the beginner I have shown in Figs. 4 and 5 how the homely kerosene-tin may be utilised for this purpose, and on the same page (Fig. 6) an effective and durable dipping-basket is shown, but this is fairly expensive. One objection to dipping the laden tray into the bath is the amount of water which the wood absorbs, and the energy in the form of heat required to dissipate it again. Against this, some argue that it keeps the trays clean and wholesome, and effectively disinfects them of insect larvæ and eggs, as well as saving much handling.

The kerosene-tin dipping-baskets need no explanation respecting their construction, excepting that the writer finds a bit of old $\frac{1}{2}$ in. rubber hose makes a good handle-grip. Further, that the holes should be pricked in the bottom and sides from the inside only, thus leaving the jagged surfaces on the outside. The handle should be made so that it folds back well to one side to permit the contents being emptied on to the tray after dipping takes place. If the tin be used in the bucket form (Fig. 4), the original handle of the kerosene-tin should remain on the bottom of the bucket as an aid to inverting it after dipping. These tins are so cheaply constructed—a man could make one in a few minutes—that I would suggest, on small areas at any rate, a sufficient number be made to enable the grower to use them exclusively for picking into, as well as dipping-receptacles, thus avoiding much handling of such fruits as prunes, etc.

The dipping-basket in Fig. 6 is made of strong galvanized wire of $\frac{1}{4}$ in. mesh. It is bound up with hoopiron, each end carrying on the outside a stouter piece of flat iron, which in turn has its end rounded and turned away at right angles from the end of the basket. These rounded ends project about $1\frac{1}{2}$ in., and support the handle, which is large enough to allow the basket to swing right around within its bow. This complete revolution facilitates the emptying of the dipped fruits from the basket to the drying-tray. This basket, as used at the Wagga Wagga Government Orchards in New South Wales, measures about 16in. x 11in. x 11in. It is strong, durable, and effective, and to be highly recommended to those who are drying fruit year after year.

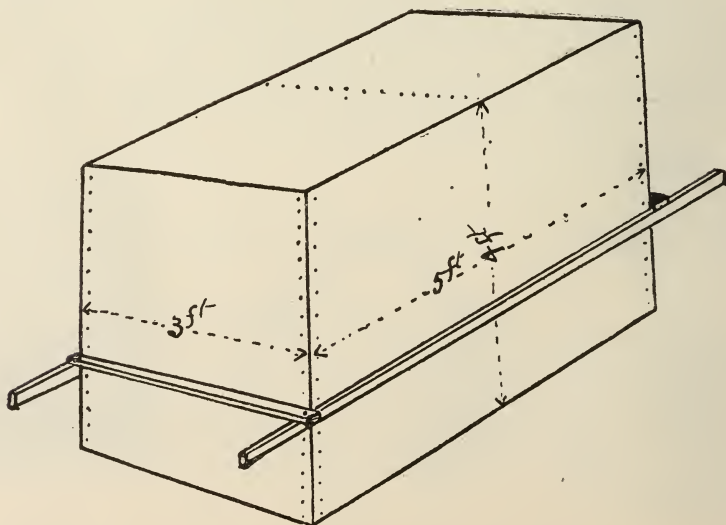


Fig. 7.

Sulphur-boxes.

In Fig. 7 a type of cheaply-made sulphuring-box is shown. It is made by joining up a framework of any light, strong pine wood of, say, 3in. x 2in. materials. The frame should be braced diagonally on all sides with lighter timber to prevent the box twisting out of square. The whole of the frame is covered with duck or stout calico, stretched tightly and tacked in position. This is then thickly coated with linewash or tar or oil to render it gastight. Near to the centre in the top a small ventilating-hole or two should be left, say in the board which runs across at this position. These holes are to assist in "drawing" the air, thus proving of much value in igniting the sulphur properly. It should be possible to close them wholly or partially with a small tin disc or regulator of some sort when the sulphur is kindled. Along each side, say at one-third of the height of the box, a handle is nailed to enable the operators to manipulate the box readily by hand.

In Fig. 8 a larger plant—as used at Rennmark, in which the sulphur-boxes are hoisted and lowered by pulleys—is depicted.

The size of the sulphur-box used should be in accordance with the trays in use. For 4ft. 6in. x 2ft. 3in. trays a hand-lifted box could be made 5ft. long by 3ft. wide, and from 4ft. to 6ft. in height. This would take one stack of trays only, but it is large enough for a beginner with a small output. It is a good plan to use two boxes, so

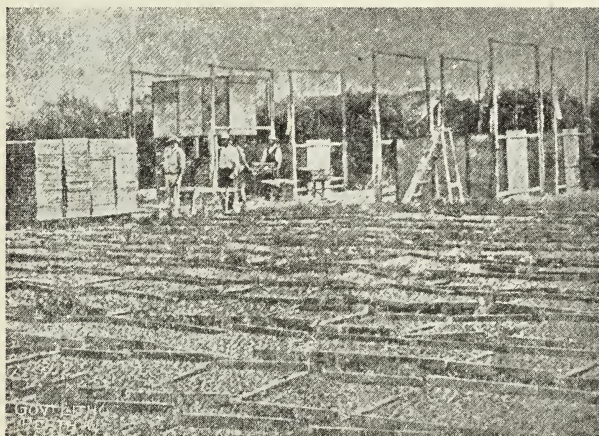


Fig. 8.

that whilst one is covering fruit which is being "sulphured" the other may be used to cover from the air the trays of fruit as it is being cut.

Tray-carrier or -stretcher.

To facilitate the handling of the trays of fruit from the cutting-bench to the sulphur-box, and thence to the drying-grounds, one or more cheap low stretchers or hand-barrows are required. These should consist of two strong handles braced with two or three cross-pieces, and supplied with four short legs. The handles should project beyond the cross-braces about twelve to fifteen inches, or at any rate about this distance beyond the trays when placed lengthwise upon the barrow. To save handling, several of these stretchers should be used, so that the sulphur-box may be stood down over the loaded carrier while the impregnating process is in operation.

Drying-ground.

Although a closely-cut lucerne field has the advantage of being freer from dust than bare open ground it also possesses the disadvantage of being cooler. This is doubtless owing to the transpiration of moisture from the green leaves of the plants, as well as to the more gradual evaporation of the dew in the morning which has been deposited overnight. The presence of this foreign moisture in the air certainly prolongs the period required for drying the fruit. The plant-life also tends to encourage the congregation of moths and other insects. A dry, hard, smooth piece of ground, away from roads or fallows, and as free from dust as possible, is usually selected for this purpose, and the trays are spread so that a narrow alley or walking-space is left between each row. Should the surface become too dusty an occasional sprinkling between the trays with water from a watering-pot or hose is valuable.

THE TREATMENT OF VARIOUS FRUITS.

The Apricot.

The bulk of this fruit, as grown here, consists of the Moorpark variety, which is well suited for drying. To make a first-rate sample of dried product the fruit should be perfectly ripe but not squashy, of large size, and free from "scab" fungus. A succession of pickings should be instituted, gathering each day all that are ready. At the cutting-sheds they are halved and at once placed upon the trays cut side upwards. For halving, a short, sharp, but stiff-bladed knife is best. Some fix the knife into the bench in a vertical position with the edge of the blade facing the operator, and, holding the fruit in both hands, press it with a quick rolling motion against the knife.

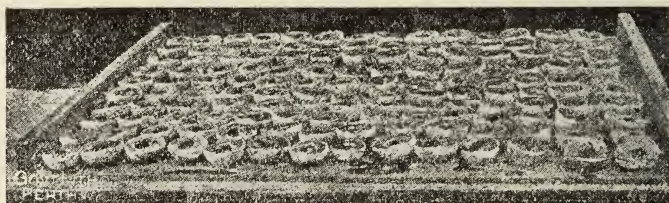


Fig. 9.

The general practice, however, is to hold the fruit between the thumb and first three fingers of the left hand, and with the other pass the knife-edge around the sutural margin of the fruit, making a complete cut all the way, thus leaving no torn or wrenched edging. By giving a natural but dexterous twist of the wrist of the hand which holds the fruit, this operation is completed with wonderful uniformity by the practised worker, and the stone or pit removed with a "flick" of the finger. Every beginner should learn to cut cleanly, as without this no first-class sample can be obtained. Clearly-cut, smooth edges give the finest finish to the appearance of the dry product.

As the apricots are halved they are placed as closely as they can rest upon the tray, each having its cup side upwards. As each tray is filled it should be stacked on the stretcher and covered with a sulphuring-box to prevent the air oxidizing and discolouring the cut surfaces.

Fig. 9 illustrates the method of placing freshly-halved apricots, peaches, and nectarines upon a tray.

The Sulphuring.

When the required number of trays are filled they are carried to the sulphuring-dépôt for impregnation with the fumes of this antiseptic. It may be explained in passing that when sulphur is burnt in an open vessel the fumes given off consist of sulphur and oxygen, in the proportion of one part of the former to two parts of the latter, forming what is called sulphur dioxide. When this compound is absorbed by moisture sulphurous acid is formed. This is a mild preservative, and it is by the union of the sulphur fumes with the moisture of the cut surfaces of the fruit that a protective coating of this acid is formed upon, and to a lesser extent within, the fruits.

The sulphur should be burnt in an iron vessel, and, as it does not readily ignite thoroughly, the vessel holding it should, as far as possible, be kept under view. Some persons dig a hole in the ground about 2ft. 6in. deep, and after placing the sulphur-oven in it and getting the contents well alight, cover it with a sheet of iron, set the trays over part of the hole, lower the airtight box around them, cover the remainder of the hole with another sheet of iron, and let things take their course. If the sulphur continues to burn, well and good, but if the box prove airtight the oxygen enclosed becomes exhausted, and the combustion of the sulphur is often brought to a standstill without burning up the quantity required for the proper impregnation of the fruit.

It has been suggested that by using an iron stove—an old oil-drum could be made to answer—sunk in the ground alongside the tray-stack, and fitted with a short curved pipe to carry the fumes beneath the enclosing box, the proper burning could be ensured. Such a stove could have a door with a closable vent in it, by which a regulated supply of air could be admitted to feed the fire. Further, in case the sulphur proved stubborn, or became completely extinguished, it could be re-ignited without losing any of the fumes already generated and confined within the box.

Some growers use a mixture of rolled (solidified) sulphur and flowers of sulphur, but whatever form is used it must be well ignited before being closed down. Live coals from a wood fire are preferred as a starter.

The quantity of sulphur used varies almost with every drier, and at least in every district. No exact experimental work appears to have been done with a view to determining how much sulphur should be oxidized per cubic foot to impregnate a given quantity of fruit enclosed. Some experienced driers affirm that 1lb. is sufficient for each 250 cubic feet enclosed within the airtight box or room. As sulphur is cheap, and the full quantity may not be properly burnt, under the circumstances more should be used than is considered merely sufficient.

The time during which apricot fruits are confined in the fumes varies likewise. Men of long experience say it cannot be properly sulphured in less than four hours, and if left in for twelve no harm is done. Most agree that the best results are obtained if the fumes have been strong enough to cause the juice to exude until the "cup" of each upturned piece of fruit is filled. The common practice is to keep on cutting so that the fumigators may be set going in the evening, and the fruit allowed to remain in the closed boxes or rooms until morning. If the morning sun shines on the fumigator long enough to raise the temperature within it slightly the exudation of the juice is hastened.

The trays of sulphured fruits are then placed out upon the drying-ground or into the evaporator. It is not desirable to place the fruit into very high temperatures straight away. If sun-drying is practised the gradual rise of the sun-heat as the day advances favours the putting out of freshly sulphured fruit in the early morning. If evaporators are used, a temperature beginning from 140deg. Fahr., and several hours later reaching 180deg, is said to prove most suitable. The drying in the evaporator should be continuous, and the product finished in about eighteen hours. In sun-drying much depends on the weather, and from two and a half to four days are average periods under favourable conditions. All of the fruits on a tray may not become dry at the same time, consequently those which have reached that pliable stage when no amount of pressure, rolling, or twisting will extract watery liquid from them should be sorted out. The less-dried specimens are placed on other trays and exposed to further drying for some hours.

When any of the fruits are collected they should be tied securely in strong calico bags, or put away in close boxes and stored in cool dry places. This is done to avoid contamination from insects, loss by weight, and discolouration generally. It is claimed that advantages are attached to taking up such fruit from the drying trays in the afternoon rather than in the evening.

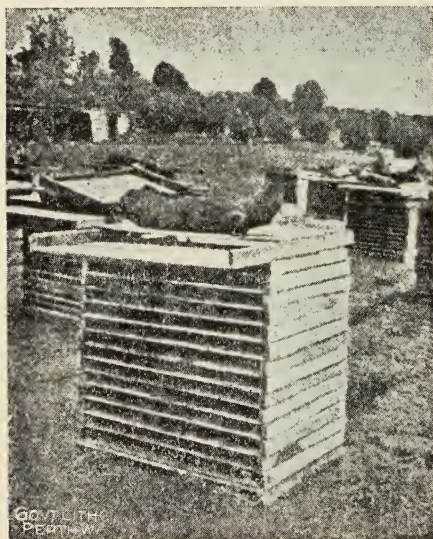


Fig. 10.

In the case of showery or damp weather coming on while fruit is being sun-dried, the trays must be covered. Fig. 10 shows a method of stacking trays and covering each stack with two empty trays held in position by means of a weighty log. This usually suffices in dry localities, such as along the region of the Murray River; but in parts where heavier rains are prevalent sheets of galvanised iron are required to run off the water.

In Fig. 11, a simple collapsible calico screen, suspended by eyelets upon fixed wires, as used at Mildura for warding off dampness or excessive heat, explains itself.

Small lots are best placed into separate grades when being lifted from the trays. Apricots are usually packed into boxes measuring $6\frac{3}{8}$ in. x $10\frac{3}{8}$ in. x 21in., and holding 28lb. The bottom of the box is carefully covered with a layer or two of fine, smooth, evenly-coloured fruits, with the open or rough side facing upwards. The body of the box is then filled with dried fruit of equal quality, and then by means of pressure the contents are consolidated. Various frames are used in which the box about to be packed is held. These are to prevent the box being bursted when the pressure is applied, and to enable the full weight to be put into each box a sort of false extension-top is required to hold the loose, bulky article before pressure is put on to it.

Prunes and Plums.

Any plum which is rich in sugar and possesses a sweet, tough skin may be dried. Varieties such as Egg-plum, Blue Diamond, and Pond's Seedling are types of unsuitable plums.



Fig. 11.

Grading and Packing for Market.

The best fruit grown here is the Prune D'Agen, an oval, medium-sized, slightly purple-tinted plum. Its pulp is exceedingly sweet, and the stone is perfectly smooth, separating cleanly from the pulp. The skin is smooth, tough, and sweet. Other dark prunes are Fellemborg, or Italian prune, which contains more acid and possesses a larger stone which does not separate from the flesh readily; Splendor, a somewhat similar fruit to D'Agen, but longer, and with a tendency to dry out to a lesser weight; the old French Prune (sometimes called Blue Imperatrice); Angelina Burdett; and Ickworth Imperatrice. Amongst the light or yellow varieties Coe's Golden Drop, Jefferson, and Reine Claude de Bavay figure most favourably.

Prunes and plums need to be perfectly ripe, almost to a cracking stage, consequently a succession of pickings have to be followed if a rich, sweet product is to be prepared from them. In some countries sheets are spread under the trees, which are then jarred with forked sticks. This shakes down the ripe fruits.

They are then carried to the dipping-tank, where a boiling solution of lye, made by dissolving 1lb. of caustic soda in from 8 to 12 gallons of water is in readiness. The fruits are dipped in the hot lye for a length of time which is based upon the strength of the dip. Some of our best driers use the stronger dip, and submerge the prunes for five to ten seconds, whilst others use the weaker lye, and dip the fruits about ten to fifteen seconds. If the lye be too hot, or the fruits be subjected to too long a dipping, they will burst when spread out upon the trays. If properly treated the skins turn brown as soon as the liquid dries off of them. Some driers dip the fruit in clean water as soon as it is removed from the lye-tank, but this is not considered essential by others of equal reputation.

If the sun is extremely hot the freshly-dipped trays of fruit should be stacked on the stretcher for an hour or two before being spread out on the drying-ground. Likewise, if artificial heat be used in kiln or evaporator the fruit should not be submitted at once to a higher temperature than about

130deg. Fahr. The reason for this care is that the fruits tend to swell and split, and leak juice if put from the dip directly into great heat.

When the yellow varieties are taken from the dip they are spread upon trays and submitted to an impregnation with sulphur fumes. One of our best producers of light prunes says they need a heavy, prolonged sulphuring to fix the colour, and strangely enough the sulphur makes the pulp part more cleanly from the stone.

Prunes do not dry evenly, consequently the fruit which has arrived at a nice, pliable, waterless condition should be sorted from the trays, graded into sizes and qualities, and bulked together into fairly large boxes or bags for a week or two at least, so that the drier specimens may draw moisture from those not quite so dry.

They are sometimes dipped again in clean water to remove dust, dried for a few hours in the sun, and then stored away. Some growers, when putting the fruit through this cleansing dip, float a little olive oil or glycerine on the surface to give a glossy pliability to the skins of the finished product.

Grading and Packing.

Prunes are graded into sizes which weigh approximately 20 to 30, 40 to 50, 60 to 70, etc., to the pound. They are usually packed in boxes of 28lb. capacity.

To present a good attractive appearance the inside of the box should be lined with white, damp-proof paper; the bottom should be faced with a couple of layers of fine fruit arranged in regular rows, the bulk is then pressed in, the lid nailed on, and the brands put on, so that the bottom now becomes the top.

(To be continued.)

CORRESPONDENCE.

ABORTION OF FLOWERS.

York, W.A..

3rd May, 1909.

The Editor, "Journal of Agriculture."

In the April number of your Journal I notice an article on "Abortion of Plants." I believe I can throw a little light on the subject, so I venture to address you.

Judging from the illustration and description the trouble is Chloranth. This is not in the strict sense a disease, but merely monstrous growth. Let me describe its course and nature.

The plant at first seems healthy, and apparently normal flower-buds appear in due course; but, as these buds unfold, something is seen to be wrong. In place of a brightly coloured corolla, there is a whorl of small green foliage leaves, and similar whorls replace the stamens and pistil; so that in place of a flower we have a rosette of green leaves. This is an ex-

treme case of Chloranthy. It is often accompanied by more or less malformation of the stem. The green flowers cannot produce fruit. Now for the cause.

Green foliage leaves and coloured floral leaves (petals) are essentially the same in nature. Both develop from precisely similar nodules formed upon the "growing point" of the stem. It all depends upon the stimulus received whether a nodule becomes leaf or petal; but there is a critical stage in its history: once it definitely starts to become a leaf it cannot thereafter become a petal, and *vice versa*. In the plants under consideration all has gone well up to the formation of nodules upon the flower "growing points." Then something has gone wrong with the works. In place of the stimulus to form flower parts, the nodules have received one to form leaves.

What has caused the wrong stimulus to be given? From observations during the last six years, chiefly on Snapdragons, but also on many other plants, I have come to the conclusion that, in the cases I have seen, the root of the trouble is deficiency of water at the critical period. From various scraps of information I think it is usually, if not always, the cause. I would suggest sub-irrigation as a means of prevention. A plant may die of thirst, while the surface soil is even too wet. If in any particular case deficiency of water is certainly out of the question, the possibility of excess or deficiency of one or more of the food-salts should be considered.

I have never yet found time to put my conclusion to the test of controlled experiment, so I cannot speak with absolute certainty. On this account I have hesitated to write; but I have decided to do so in the hope that my observations may prove of use to some sufferer. I feel but little doubt that, if my advice is taken, the desired result will be obtained. A cure should not be necessary; but cut well back and attend to the watering, if the trouble does appear. I shall esteem it a favour if anyone, who takes my advice, will inform me of the result, giving details.

This is written in a "popular" strain, and the science part must not be taken as absolutely accurate. A plant is an extremely complicated machine; and its mechanism cannot be fully explained in a few sentences.

I am,

Yours faithfully,

OSWALD H. SARGENT.

[It is evident that besides the lack of moisture referred to, there must be other exciting causes. A number of plants showing malformation of flowers could be noticed last summer through the moisture districts of the South-West, where the land is always more or less damp.—Ed. *Journal of Agriculture*.]

JUTE AND CASTOR-OIL CULTIVATION.

Mr. Eric J. Starey, Boulder, inquires: "Are there any books or pamphlets published on jute cultivation, especially from an economic point of view, relating to cost of planting, rainfall and climate, and soil suitable; also, any information on castor-oil cultivation on a large scale?"

In reply to the above the Under Secretary writes:—

"I regret that we have not, in the *Journal* published by this Department, any exhaustive information concerning the cultivation of Jute or Castor-oil Bean.

"We have growing on the Hamel State Farm some jute introduced from India, and it does very well there. Seeds were also forwarded to the North-West, where a good account is the result. Considering the cheapness of this material in India and other countries where labour is not so costly as in this State, I would rather recommend going in for a more valuable fibre, such as Sisal hemp.

"Regarding the Castor-oil Bean, you are aware that it grows in this State with the luxuriance of the weed. It requires a good sandy loam, well drained. The land is prepared with the plough and the harrow in the ordinary way, and rows spaced at 2 to 4 feet, with wider intervals about every sixth row, to enable a cart to be driven along to gather the beans. Half a dozen beans are planted in one hole, and these are thinned down to one only, when the cutworm season has passed (November-December).

"The beans are sown in the spring, and they ripen in the summer, the annual average yield being 10.14 bushels per acre. In order to ensure a better germination hot water, a little below boiling point, is poured on the seeds, and they should be allowed to soak in this for about 24 hours. Unless this is done the seeds take weeks to germinate. Cultivate until the plants are a couple of feet high. The seeds are carried in husks or pods on spikes of various lengths. They should be gathered before these pods are over-ripe to save the seeds being scattered over the field. The ripening season extends over some weeks, and this necessitates several pickings. The spikes or clusters of pods are taken from the cart to a drying place in the sun, and enclosed within side boards to prevent the beans from popping outside. The spikes are turned occasionally, until all the pods are burst. It is important that beans should not be allowed to get wet, as this discolours them, and lowers their market value. After each drying the beans should be swept up and run through a fanning mill, and stored in dry places. If the pods are turned on to the soil after the beans have been picked, a good deal of the fertilising element subtracted by the plant is returned to the land. It is estimated that 100lbs. of dry spikes or clusters of pods produce about 55lbs. of beans and 45lbs. of pods. The best beans vary from 40 to 41lbs. per bushel when cleaned, and those of a lower quality are lighter. The beans contain about 50 per cent. of oil."

DISEASE AMONG SHEEP AT YALLINUP.

Mr. R. E. Weir, V.S., Chief Inspector of Stock, submits the following report on the causes of mortality among sheep at Yallinup, to which breeders should give serious consideration:—

"I have to report having visited the Yallinup district during the past week, and made an inspection of Messrs. House and Forrest's sheep, both graziers having reported a serious mortality amongst their flocks during the past twelve months.

"It appears that Mr. House has lost some 100, and Mr. Forrest some 50 head, and losses are still continuing. I made a careful examination of Mr. House's sheep, a number of which showed distinct signs of disease, the chief symptoms being general debility, dropsical swelling in the lower maxillary space and weakness particularly of the hind-quarters.

"One was selected for *post-mortem* purposes, the appearances being as follows:—Dropsical effusion into the abdominal cavity and tissues of lower maxillary, general debility of system, a few parasites discovered in alimentary track and lungs. They were, however, not sufficiently numerous to be the cause of the disease, and in consequence I had to make further investigation to find out the seat of trouble. This was found in connection with the larger joints, the cartilage of which showed marked ulceration resulting from an insufficiency of lime salts in the food supply. The lack of phosphate of lime in particular is a common cause of disease amongst stock in this State, which more generally applies to the South-West and Eastern districts, and until such time as the land becomes sufficiently supplied with this very necessary element of nutrition to plant and thereby animal life, stock must of necessity be unthrifty, and if continued for any lengthened period, will develop disease and die. It behoves settlers, therefore, to steadily improve their lands in this direction, and in due course all the required elements necessary for the proper maintenance of animal life will be duly provided.

"In the meantime land of this character should not be utilised for breeding purposes unless artificial feeding be resorted to. Young growing stock require a greater amount of lime salts, and for this reason it is necessary that this class of animal be supplied with the required elements necessary for healthy growth; it is with these principally that losses occur if insufficiently nourished. For the successful management of stock on land of this character it is necessary that stores require to be purchased at a time of the year when feed is sufficiently matured; and when fattened, disposed of to the butchers, a small supply only being kept on the holdings during the latter part of the summer. If settlers were to work on this principle good returns would be obtained and little or no losses would occur.

"I also made a *post-mortem* examination on one of Mr. Forrest's sheep, in which the disease was in a more advanced stage, severe diarrhoea being present, and the animal in a very weak condition. The same appearances as above stated were found, with the exception that no parasites were present in this instance."

BRITISH DAIRY EXHIBITION.

(BY PERCY G. WICKEN).

When in London last year I took the opportunity of visiting the Agricultural Hall at Islington, where the British Dairy Farmers' Association held their Annual Show. This large hall, where at one time the Royal Agricultural Society of England held their annual shows, was again filled with a large exhibit of dairy produce. In the centre of the main floor were stalled about 250 of the best dairy cattle to be found in England; the breeds shown included Shorthorns, Jersey, Guernsey, Red Poll, Ayrshire, Kerry Dexter; but the Shorthorns were the most numerous class of these, and the majority were red in colour. The prize for the best Shorthorn cow in milk was secured by Lord Rothschild's "Dorothy," colour red, age seven years five months; while that for the best Jersey went to Lady de Rothschild's, of Tring's, cow, "Jersey Dame," aged eight years five months. Lord Rothschild also secured first prize for his Red Polled cow "Cheddar," aged four years eleven months. The prize for the best Shorthorn bull was awarded to Messrs. R. W. Hobbs & Son's roan bull "Tarquin II.," who appeared to be a very fine animal.

I was particularly struck with the large number of milking goats shown adjoining the cattle in the hall. There were no less than 75 entries in this section, and the competition served to show what a wide interest is taken in goat-breeding for the purpose of providing small households with a supply of milk. In the centre of the main hall, in a round stand specially fitted for the purpose, exhibitions of butter-making were given at intervals during the day. There were about 20 churns in this stand, and all of them worked by dairymaids. Seats were provided so that visitors could sit down and watch the operations from the time the cream was received until the butter was ready for sale. All the churns in use in this section were of the barrel shape, and were all turned by hand.

Other exhibits in the main hall consisted of seedmen's exhibits, oil cake preparations, stalls for selling veterinary appliances, oil and producer-gas engines in motion; and very fine stalls, particularly those of the Dairy Supply Company, of Museum Street, and the Dairy Outfit Company, of King's Cross, where everything required by a dairyman could be obtained of the latest pattern, while around the sides of the building were arranged all kinds of dairy carts, from the can of milk fixed on a tricycle, which a boy pedals along, to the large van used by the distributing cold storage companies.

In a small hall opening out of the main hall was the section where the milk testing was carried on, and owing to the large number of entries in the various sections there was a considerable quantity of work to do, as the butter was actually made from the milk, and the award was not given on the result of the Babcock test. In a conversation with the gentleman in charge of this section, I ascertained that the prize was won by Mr. A. Miller-Hallett's "Goddington II.," Jersey cow, age five years seven months; she had been 92 days in milk, and gave 43.14lbs. of milk in the 24 hours, which yielded 2lbs. 3½ozs. of butter, or equal to 19.17lbs. of milk to 1lb. of butter.

In another hall, known as the Gilbey Hall, opening out of the main hall, was exhibited the dairy produce proper. On entering the hall we first passed several stalls of honey, all of the white colour, characteristic of English clover honey; then we come to the cheese exhibits, where cheese was to be seen by the ton. The cheese was displayed on low tables about a foot from the ground, which were first covered with straw. Each table is about 60 feet long and six feet wide, and there were a dozen of these tables filled with cheeses of all sizes; the cheddar cheeses are mostly 60lbs. weight, but the other varieties, such as Stilton and Gorgonzola are about 10lbs. in weight. At a stall in the cheese section small samples of the prize cheeses were placed in small cardboard boxes and sold at 3d. each. Large quantities of bacon were also shown, but the average quality of it did not look so well as that shown at the principal shows in Australia. Butter was exhibited in large quantities, and was worked up into all kinds of flowers and fancy designs.

The most interesting part of this exhibition to me was the Colonial butter section, as here a large number of entries had been made by all the Australian States. There were two classes, one for 56lbs. of salt butter, and the other for 56lbs. of fresh butter. In the first, for salt butter, Queensland had 23 entries, Victoria 18, New South Wales 9, South Australia 6, Western Australia 1; the Western Australian butter did not arrive until too late. The butter was judged on the following scale of points:—

<i>Flavour</i> —should be sweet, mild, and nutty	..	..	55	points
<i>Texture</i> —should be firm and granular	..	..	20	..
<i>Colour</i> —should be clean straw colour throughout	..	..	10	..
<i>Salting</i> —should be sufficiently salted without destroying the natural flavour peculiar to butter	..	..	10	..
<i>Packing</i>	..	..	5	..
				— —
				100 points
				— —

The prizes were awarded:—

- 1st.—Onkaparinga Cheese and Butter Factory, Woodside, South Australia.
- 2nd.—Traralgon Butter Factory, Traralgon, Victoria.
- 3rd.—Oakey Dairy Factory, Oakey, Queensland.

In the fresh butter exhibit, Queensland had 19 entries, Victoria 15, New South Wales 10, South Australia 5, and Western Australia 1; but Western Australia failed to exhibit. The butter was judged on the following scale of points:—

<i>Flavour</i> —should be sweet, mild, and nutty	..	..	60	points
<i>Texture</i> —should be firm and granular	..	..	25	..
<i>Colour</i> —should be clean straw colour throughout	..	..	10	..
<i>Packing</i>	..	..	5	..
				— —
				100 points
				— —

The prizes were awarded:—

- 1st.—Traralgon Butter Factory, Victoria.
- 2nd.—Framlingham Butter Factory, Victoria.
- 3rd.—Goombringe Co-operative Dairy Society, Queensland.

The butter in the Colonial section was exhibited in plain boxes, made the same size and shape, and did not lend itself to any fancy display, but the quantity and quality were both there, and the exhibit attracted a good deal of attention.

The only general Colonial exhibit shown in this section was from the State of Rhodesia; they had a stall on which was a display of all kinds of seeds and farm produce, while the Department of Agriculture of Ireland made a fine display of bacon, ham, butter and eggs, packed in various styles.

In the spacious galleries of the building were to be seen on one side a large number of poultry exhibits, and on the opposite a collection of pigeons. In the poultry section there were 3,330 entries, including all known breeds of fowls and ducks, while the pigeons numbered 2,564, or a total of 5,894 in the two sections, a number sufficient to make one think that he would never come to the end of them. The other exhibits in the galleries consisted of poultry food and appliances, incubators, etc.; one of the principal features was the large number of portable poultry houses constructed of soft wood, which appeared to be offered at very low prices; a portable house with all sorts of patent appliances capable of housing 100 fowls was obtainable for about £3 10s. The poultry exhibit was of considerable interest to those engaged in the industry.

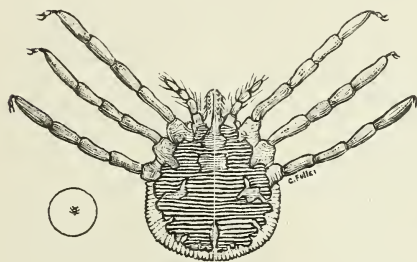
POULTRY NOTES.

By FRANK H. ROBERTSON.

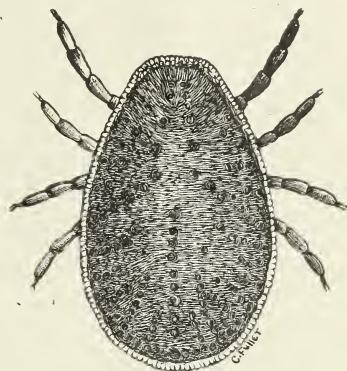
THE TICK PEST.

The poultry tick is a pest which is now, unfortunately, very prevalent in this State. The life history of this pest is rather curious. The eggs, which are of a pinkish colour, are laid in clusters of 50 to 100, and are easily discernible by the naked eye. They are to be found in crevices, under bark, splinters of wood, or any similar hiding place. The eggs hatch in about a month after being deposited. At this stage they are nothing like the adult tick, being light and feathery-looking little objects, with six extra long legs. They then fasten on to their hosts—the fowl—by burying their heads into the flesh, and will be found in clusters principally under the wings, but if very numerous are scattered all over the body. Only little black specks are showing, which are impossible to remove without killing. They gorge themselves with blood, and drop off the fowls in five or six days, but during that time they change their appearance completely. They moult and assume the form of the adult tick. They then take to the wood-work of the fowl-house, and remain in the cracks or under bark or splinters, only coming out when hungry at night time, to draw the blood from the fowls. Their existence is passed chiefly in their hiding places. They moult their skins two or three times, and take long periods of rest between meals. They can live without food of any sort for a long period. I have found them alive in wood-work a year after all fowls had been removed. I have also

kept them many months in small boxes and bottles. The adult tick is of a dark slate colour, and varies in size from $\frac{1}{8}$ to $\frac{1}{4}$ of an inch in length. It shrivels up very much when confined and without food, and then is of a brown colour.



YOUNG LARVÆ, GREATLY MAGNIFIED ;
NATURAL SIZE WITHIN CIRCLE.



ADULT FOWL TICK, GREATLY MAGNIFIED.

Tick-infested fowls present a miserable appearance; dull plumage, feverishness, leg weakness, and frequently diarrhœa, death resulting in a few hours. Many, however, get over the effects in a few days, especially if they are given a light and nourishing diet, such as beaten-up egg. Port wine is also an excellent remedy for the complaint.

Fowls that recover are immune from further attacks from the pest; their blood is evidently inoculated with the poison, hence the immunity. This fact very often misleads poultry-keepers into supposing that there are no tick in their fowl-houses. The birds may look well and lay satisfactorily and yet the place be badly infested; but fowls existing under such conditions must require extra feeding to replace the blood taken by the ticks. There is generally a great difficulty in rearing chickens. Any fresh birds brought to the yard suffer very severely, and fowls or boxes leaving such a yard are the usual medium of disseminating the pest.

It is very surprising the rapidity with which the pest has spread over this State. Ten years ago it was almost unknown. It now behoves all poultry-keepers to exercise the greatest care in preventing its further spreading. One great disseminating agent has been from the almost universal custom of erecting the fowl-house at the end corner of the yard. For the sake of economy, the existing fencing forms one side and the back; the consequence is that the tick crawls along the fences from one fowl-house to the other, until whole blocks become infested. The fencing is a particularly difficult matter to deal with; the ticks get behind the pickets, and into the posts where the rails are let in. All fowl-houses should be built as far away from fencing as possible.

Another common source of spreading the pest is by fowls flying from one yard into another and roosting in the neighbour's fowl-house.

Ticks do not germinate spontaneously, even in the dirtiest and worst-kept yards; they are always brought by fowls or by boxes or crates which

contain ticks or their eggs. Country storekeepers are a not uncommon source of spreading the pest, as many of them deal in fowls. The tick get into the empty cases stored in the back yard, and as these are used for sending away goods in, the infection is thus spread far and wide.

Many poultry-keepers, on finding their fowl-houses tick-infested, burn them down and compel all the fowls to roost in trees, being under the impression that the pest is in this simple manner exterminated. Such, however, is not the case, as some of the fowls are likely to have ticks on them. They then drop off the fowls and remain under the bark or dry parts of the limbs and worry the fowls in the same manner as in a fowl-house; and when once a tree becomes badly infested it is even more difficult to treat than a wooden building. If not cut down and burnt, flaring the limbs with kerosene, turpentine, or spirits of wine would no doubt eradicate the pest if carefully done. I have frequently found tick in pepper trees, and even in castor-oil trees.

Great care should be exercised in purchasing poultry to ascertain that they come from yards or districts that are free of tick. Albany is at present quite free of tick, and probably the whole of the South-Western districts, such as Bunbury, Busselton, Bridgetown; but Northam, York, Newcastle, Beverley, Geraldton, and the goldfields are all infected. Perth and suburbs are also very bad. In introducing fresh blood into a yard, the safest plan is to secure eggs and hatch them; but if fowls are obtained from other places they should, before being introduced to a clean yard, be kept in quarantine for at least seven days in quarters quite away from the other fowls. The cloth bandages round the perches, to act as traps to catch any tick which may have dropped off the birds, examine the bandages in a few days, and if they contain tick burn the cloths and replace with fresh ones. Dipping fowls cannot be considered effective. Embryo ticks, when fastened on to a fowl, can be killed by smearing them with grease.

Many persons, on suspecting that their fowls are tick-infested, go to a great deal of unnecessary trouble in making a thorough examination of the fowls, looking for tick on them, and dipping the whole flock. It does not follow because no tick are to be found on fowls, that they are not subject to attacks from the pest: it should always be remembered that ticks only spend seven days of their existence on the fowls, therefore searches may be frequently made without results. The proper way is to take a thin-bladed knife and insert it into the cracks and crevices of the woodwork in the vicinity of the perches, paying particular attention to the top corners of the woodwork frame of the fowl-house; if the blade shows blood and portions of ticks, their existence is thus easily proved.

Persons removing from one yard to another should make a careful examination of the house as above described, before placing their fowls in fresh quarters.

ERADICATION.

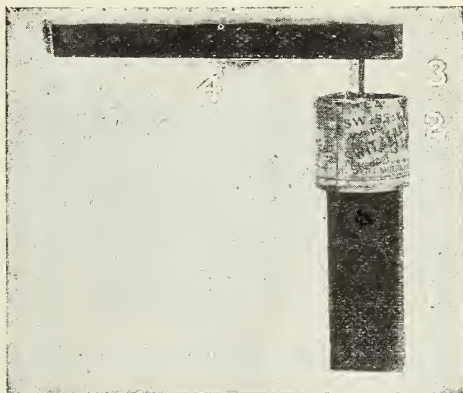
The eradication of tick is a simple matter if proper precautions are taken. The safest plan is to burn down the building and erect a new iron one as already described, and provide same with tick-proof perches, to prevent any stray tick that may be about from getting a feed off the fowls, and tie cloth bandages round the perches.

There are several forms of such perches. One good plan is to suspend the perches by wires from the sides of the walls, running the wire through a soldered tin or inverted and corked neck of a bottle, keeping same filled

with water and kerosene. Another plan is to use down-piping in lengths of about $2\frac{1}{2}$ feet. Hammer, say, six inches into the ground, and on top of the piping affix the perches; but to prevent ticks crawling up, a cup is soldered round the piping and kept filled with water and kerosene.

This illustration shows a very simple and inexpensive form of a tick-proof perch:—

The upright (1) is of 3 x 2 jarrah, and is sunk into the floor of the fowl-house, leaving from $1\frac{1}{2}$ to 2 feet above the ground. Then take an empty milk-tin (2); first make a small hole in the centre of the bottom of the tin, continuing through for half an inch into the upright, then tack the tin on by using a long-headed hammer or an iron chisel. Then take a six-inch spike (3), knock off the head, and drive the spike into the upright. To make the cup water-tight run in melted sealing-wax or pitch, thoroughly covering the bottom of the tin. The perch (4) has a hole bored half-way through to hold the perch



in position. The cup (2), if always kept filled with liquid, will prevent tick crawling up to the fowls; and if a rag is kept round the upright it will act as a trap, and can be removed frequently to see if it contains ticks. The cracks and crevices in the perch (4) should also be inspected to see if they harbour young tick which have dropped off the fowls. All perches should be the one height, and quite away from the walls of the fowl-house. All nest-boxes must also be made tick-proof by being composed entirely of metal, or resting on tick-proof stands, in a similar manner to the perches. Also see that no ticks harbour under the milk-tin where it rests on the upright.

Chickens should be kept quite away from the tick-infested part of the yard, but if this cannot be done they must be isolated at night-time by making their nest-boxes tick-proof.

To destroy tick in buildings or fences boiling water, also a three-per cent. solution of carbolic acid and water, is a reliable agent; kerosene is also good, and tar is another very good tick destroyer, especially when applied to fencing; but whatever is used, it must be done thoroughly and got right into crevices and behind nailed timbers. The tick, being a flat insect, can secrete itself in very small spaces, hence the necessity of dismantling timber to get at it; but in some instances it is found impossible, or likely to entail too much expense, to dismantle substantial woodwork. In such cases tar will be found very serviceable, but it should be liberally applied and run well into the crevices, completely stopping them up; if this is properly done the tick will be imprisoned, and thus starved to death. Cloth bandages should always be tied round perches to act as traps and taken off occasionally and destroyed, thus with iron houses built away from fencing, and provided with tick-proof perches, the pest can be eradicated.

FOURTH SUBIACO EGG-LAYING COMPETITION.

Commenced on 1st May.

The fourth of the series of egg-laying competitions, conducted by the Department of Agriculture, commenced on the 1st instant. The following are the entries and the prices, respectively, of eggs per dozen for setting:—

HENS.

Pen No.	Owner.	Breed.	Strain.	Price. s. d.
1	Jack R. Parkes ..	White Leghorn	Own breeding	12 0
2	H. Hunter ..	Plymouth Rock	American	..
3	W. H. Wright ..	White Leghorn	Own breeding	..
4	E. E. Ranford ..	Minorca ..	Own breeding	10 6
5	Jack R. Parkes ..	White Leghorn	Own breeding	10 6
6	E. E. Ranford ..	Black Orpington	Own breeding	10 6
7	Gwalia Pen ..	White Leghorn	Own breeding	10 6
8	J. E. Pryke ..	White Leghorn	Own breeding	10 6
9	A. L. Ballantyne ..	White Leghorn	Own breeding	10 6
10	White Wings P. F.	Black Orpington	Mrs. Craig	10 6
11	M. Love ..	White Leghorn	Own breeding	15 0
12	Sunflower P. F.	White Leghorn	Small	10 6
13	Mrs. A. Robinson (No. 2)	White Leghorn	Own breeding	10 6
14	E. E. Ranford ..	Brown Leghorn	Own breeding	12 6
15	Paddy King and Salter	White Leghorn	Own breeding	10 6
16	Greenville P. F.	Silver Wyandotte	Own breeding	21 0
17	Lionhurst P. F.	White Leghorn	Own breeding	10 6
18	F. Whitfield ..	White Leghorn	Own breeding	10 6
19	Austin and Thomas	White Leghorn	Own breeding	10 6
20	Craig Bros. ..	Black Orpington	Own breeding	10 6
21	A. H. Padman (S.A.)	White Leghorn	Own breeding	21 0
22	Mrs. E. Douglas	Black Orpington	Own breeding	12 6
23	Mrs. L. Mellen ..	White Leghorn	Own breeding	10 6
24	Mrs. E. Small ..	British Game ..	Own breeding	10 6
25	Stephen Craig	White Leghorn	Own breeding	12 6
26	Carlowie P. F. ..	Brown Leghorn	Own breeding	10 6
27	C. B. Bertelsmier (S.A.)	White Leghorn	Own breeding	15 0

28	J. Faulkner	..	..	..	Golden Wyandotte	..	..	Own breeding	..	..	10	6
29	Mrs. S. Dixon	..	..	..	White Leghorn	..	..	Own breeding	..	..	10	6
30	S. W. Stewart	..	..	..	White Leghorn	..	..	S. Craig	..	..	10	6
31	Wilson and Cæsar	..	..	..	White Leghorn	..	..	Own breeding	..	..	15	0
32	Bert O'Shannassy	..	..	..	White Leghorn	..	..	Own breeding	..	..	10	6
33	C. L. Braddock	..	..	..	White Leghorn	..	..	Wharepaka	..	..	15	0
34	A. W. Green	..	..	..	White Leghorn	..	..	Own breeding	..	..	12	6
35	D. Mildren (S.A.)	..	..	..	White Leghorn	..	..	Own breeding	..	..	15	0
36	J. Faulkner	..	..	..	White Leghorn	..	..	Padman-Sunnyhurst	..	..	12	6
37	Belmont P. F.	..	..	..	White Leghorn	..	..	Own breeding	..	..	12	6
38	Stafford Bros.	..	..	..	White Leghorn	..	..	Own breeding	..	..	10	6
39	F. S. Squires	..	..	..	White Leghorn	..	..	Sunnyhurst	..	..	10	6
40	White Wings P. Y.	..	..	..	White Leghorn	..	..	Own breeding	..	..	10	6
41	R. L. Martin	..	..	..	White Leghorn	..	..	Own breeding	..	..	10	6
42	South Perth P. F.	..	..	..	White Leghorn	..	..	Small	..	..	10	6
43	Mrs. A. E. Kinnear (S.A.)	..	..	..	White Leghorn	..	..	Own breeding	..	..	21	0
44	Cæsar and Geddes	..	..	..	White Leghorn	..	..	Own breeding	..	..	21	0
45	Mrs. A. Robinson (No. 1)	..	..	..	White Leghorn	..	..	Own breeding	..	..	10	6
46	Mrs. M. Kynaston	..	..	..	White Leghorn	..	..	Own breeding	..	..	15	0
47	G. W. Johnson	..	..	..	White Leghorn	..	..	Own breeding	..	..	10	6
48	Sunnyhurst Egg Farm (S.A.)	..	..	..	White Leghorn	..	..	Own breeding	..	..	21	0
49	Greenville P. F.	..	..	..	White Leghorn	..	..	Own breeding	..	..	21	0
DUCKS.												
1	Jack R. Parkes (No. 1)	..	..	..	Indian Runner	..	..	Dusting-Walton (England)	..	..	21	0
2	Simplex Incubator Factory	..	..	..	White Indian Runner	..	..	Own breeding	..	..	12	6
3	Jack R. Parkes (No. 2)	..	..	..	Indian Runner	..	..	Walton (England)	..	..	21	0
4	Greenville P. F.	..	..	..	Pekin	..	..	Own breeding	..	..	12	6
5	H. Carr	..	..	..	Indian Runner	..	..	Own breeding	..	..	10	6
6	Mrs. Ginder	..	..	..	Aylesbury	..	..	Own breeding	..	..	10	6
7	K. Becker	..	..	..	Indian Runner	..	..	Own breeding	..	..	10	6
8	Mrs. Ginder	..	..	..	Rouen	..	..	Own breeding	..	..	10	6
9	P. Lyons	..	..	..	Indian Runner	..	..	Own breeding	..	..	21	0
10	White Wings P.F.	..	..	..	Buff Orpington	..	..	Own breeding	..	..	10	6
11	P. O'Connor	..	..	..	Indian Runner	..	..	Own breeding	..	..	15	0
12	Mrs. E. Small	..	..	..	Pekin	..	..	Own breeding	..	..	10	6
13	J. T. Johns	..	..	..	Indian Runner	..	..	Own breeding	..	..	15	0
14	G. Thomson	..	..	..	Indian Runner	..	..	Own breeding	..	..	21	0

FOURTH SUBIACO EGG-LAYING COMPETITION—continued.

DUCKS—continued.

Pen No.	Owner.	Breed.	Strain.	Price. s. d.
15	C. W. Johnson ..	Indian Runner ..	Own breeding ..	10 6
16	Greenville P. F. ..	Indian Runner ..	Own breeding ..	15 0
17	Carlownie P. Y. ..	Indian Runner ..	Own breeding ..	12 6
18	Rowenhurst Pen ..	Indian Runner ..	Brackenbrae-Thomson Dusting ..	10 6
19	D. Vincent ..	Indian Runner ..	Own breeding ..	12 6
20	F. Whitfield ..	Indian Runner ..	Own breeding ..	12 6
21	Mrs. L. Mellen ..	Indian Runner ..	Own breeding ..	10 6
22	White Wings P. F. ..	Indian Runner ..	Own breeding ..	10 6
23	South Perth P. F. ..	Indian Runner ..	Own breeding ..	10 6
24	A. Pratt ..	Indian Runner ..	Dusting ..	10 6

No guarantee given with Eggs.

Freight to be added to above prices per dozen :—1 up to 300 miles, 3d. ; 301 up to 500 miles, 6d. ; Over 500 miles, 9d.
No eggs sold after 1st December.

SPINIFEX AS STOCK FEED.

A writer in a recent issue of the *West Australian*, describing the country in the Nor'-West, bears testimony to the value of the spinifex as an indigenous herbage for stock, with which nature has provided Australia for times of drought. He writes:—

“Over the granite plains, which are reached at Poondina, there is no great depth of soil, but all the land is taken up by pastoralists. Here and there are native grasses, but the main feed is supplied by spinifex. This is a species of grass which has a permanent stock, from which in rainy weather young shoots spring up and throw out heads of grain, which give the country the appearance of oatfields. The soft spinifex is very nutritious; some prickly species are of little value. Both alike were despised until quite recent years, but sheep and cattle thrive well here. It is said that stock do not pay, but beef is 8d. a lb. As squatters do not spend money on stall-feeding or putting frills on their bullocks, there should be a little margin for the poor breeder. Had the Nor'-West received the same treatment as the Sou'-West there would have been an experimental farm somewhere and as much pains taken to evolve new and more valuable species of spinifex as is taken down south with new varieties of wheat. In the Marble Bar Hospital compound a couple of inches of rain brought up several spinifex seeds, which six weeks later were a foot high, without a further drop of rain. Their roots strike deep, and have a wonderful faculty for penetrating between cracks in the rocks, so that spinifex is just as much in evidence in the rocky hills of the interior as on the granite plains of the coast. This is all the more wonderful when we consider the dryness of the atmosphere inland. The vapour in the air and the dews at night might be a substitute for rain in the coastal belt, but around Marble Bar so intensely dry is the atmosphere that a water bag by sheer evaporation will bring the temperature of its contents down 25deg., while at Port Hedland the reduction might be 5deg. The heat of the sun on the rocks is so great that little black ants if exposed to its direct rays die in a few moments—even fair-sized lizards will quickly perish if placed on a hot rock. The ubiquitous “F sharp,” which abounds almost everywhere, finds the dry heat of the interior too much for him, and yet in the midst of all these unfavourable circumstances spinifex flourishes. Horses getting nothing else can do long trips. The grain-bearing tips can and have been reaped for hay. In fact, seeing it costs £2 10s. a week to stall-feed a horse, it is a wonder that no one cut and stored the fodder in the town common that was afterwards devoured by locusts. The spinifex seems far too valuable a fodder to be left altogether to nature. It will prove the Cinderella of the sisters here. If it turns out that nothing can be cultivated in all this plain region extending for 60 miles along the route from the Poondina Hotel to the Coongan River Hotel, and that the pastoralists are to hold sway for ever, then there is some consolation in the feeling that wool is in growing demand all over the world, and that Australia seems specially adapted for merino sheep, and her fleeces always likely to realise a payable price. But it is unthinkable that all the huge tracts of this fair land, now solely occupied by flocks and herds, should remain at that stage for ever.”

THE OFFICIAL YEAR BOOK OF THE COMMONWEALTH— No. 2.

We have received from the Commonwealth Statistician (Mr. G. H. Knibbs, F.S.S., etc.) a copy of the second "Official Year-Book" of the Commonwealth of Australia, dated 1909, and just published under the authority of the Hon. H. Mahon, M.P., Minister for Home Affairs. The first number of the Year-Book, published last year, was so favourably received and was in such demand that this year it has been considered necessary to largely increase the number published.

The statistics comprised in the new volume are, as far as possible, given for each State and for every year since the inauguration of the Commonwealth, including particulars for the year 1908, so far as they have been compiled. The publication also furnishes corrected figures from the earliest times, in some cases dating as far back as 1788.

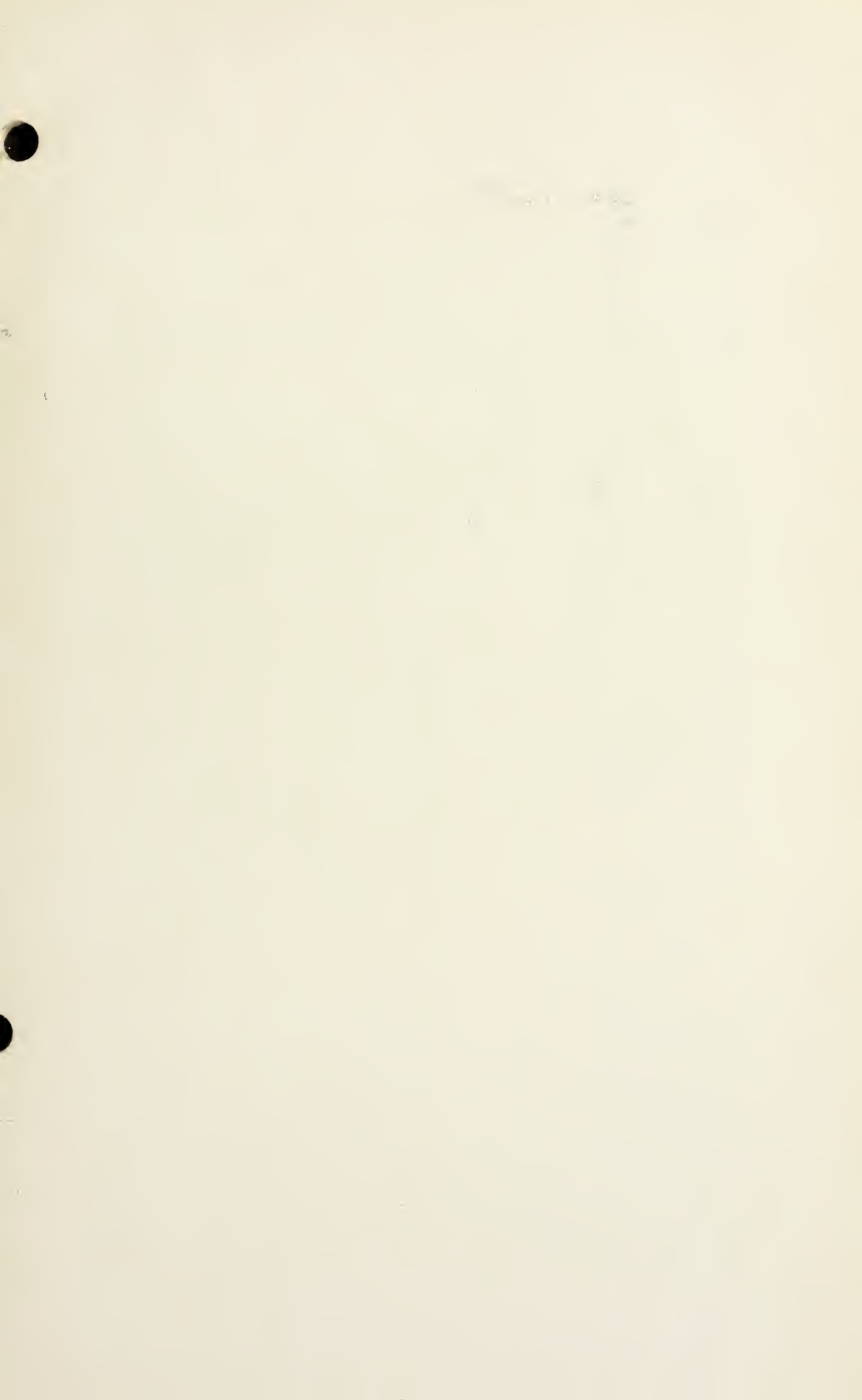
In addition to the matter usually contained in a publication of this description, the Year-Book is supplemented by the inclusion of a large number of new maps, tables, diagrams, and graphs. Some of the sections given in the first Year-Book have now been considerably condensed, while others have been elaborated, and new articles dealing with matters of special interest have been added.

Among the subjects on which new articles have been introduced the following may be specially mentioned:— The Exploration of Australia (with maps); The Constitutions of the States; The Hydrology of Australia (with lengths of rivers); The Development of Australia's Trade with the East; The Customs' Tariff, 1908; Kindergarten Education; Administrative Government; Public Lighting; Papua; and Local Option. The article on Manufacturing Industries has been rewritten, and contains a number of new tables, while a great part of the article on Railways is also new. The subject of Land Tenure and Settlement is dealt with exhaustively, and a comprehensive description in a classified and co-ordinated form of the land systems of the several States is published, it is believed, for the first time. A number of new maps, in addition to those comprised in the last Year-Book, are also included in the publication, such for instance as the maps of the Geology of Australia, the Orography of Australia, the Progress of Exploration, and Australia and New Guinea.

A feature of the Year-Book worthy of note is that the latest returns available up to the hour of going to press have been included in an Appendix.

It is evident in the present publication that the scheme of co-ordination of statistics outlined and agreed upon at the Statistical Conference of 1906 has resulted in considerable improvement in the collection and presentation of Australian statistics on a uniform basis, so that the returns for the several States are now in nearly every case directly comparable.

The Commonwealth Year-Book is a compendium of all matters affecting the economic and industrial conditions of Australia, and is a *sine qua non* for the publicist for purposes of reference.



Inspector E. Bailey. Geo. Compere, Entomologist.



L. J. Newman, Assist. Entomologist.
INSECTARY, DEPARTMENT OF AGRICULTURE, PERTH, W.A.

BENEFICIAL PARASITES.

By L. J. NEWMAN, Assistant Entomologist.

The subject of insect parasitism is not only fascinating from the standpoint of science, but is one which affects either directly or indirectly every species of plant or animal on the face of the globe. Insects in their natural condition are kept in check by a host of parasitic insects, of which various kinds are specialised for attacking their food-insect in particular stages.

It is stated that under natural conditions 80 or 90 per cent. of the annual increase is destroyed by other insects. The rapidity of increase among injurious insects which become introduced into new regions, where they are not kept in check by their parasites, was early noted by entomologists. Under these conditions and a plentiful supply of food they at once begin to increase at a phenomenal rate. Such conditions of rapid reproductions are the outcome of the introduction of an insect without its natural checks. The value of insect friends in combating injurious pests is but little understood, and in fact very few of those receiving a direct benefit even know of the existence of their benefactors, but were these benefactors removed, we should very soon feel their loss and perhaps better appreciate their value.

The term parasite has somewhat of a general meaning. Take for instance the flea: it is a true parasite of mankind; it lives and has its home upon the body of its host, but does not destroy life. The bee moth is another example; it lives upon the wax of the hive but does not destroy the bee.

Beneficial insects belong to neither of these two classes, because they not only feed upon the body of their victim, but cause its death thereby. For this reason that class of insects which in this paper are termed parasites are by most naturalists designated cannibals, which is really the proper term. These belong to three orders, the *Hymenoptera*, *Diptera*, and *Predaceous*.

The *Hymenoptera* are subdivided again into three sub-families, the *Ichneumons*, *Chalcids*, and *Braconids*. The *Ichneumons* are the most easily recognised, having as a rule long slender bodies with a protruding ovipositor, very often mistaken for a sting, but which is the instrument used for piercing the host attacked, and down which the egg is passed into its body, hatching within and thereby destroying and preventing the reproduction of the pest.

The *Chalcid* flies are usually much smaller, and reproduce themselves in large numbers within their host, or else when full grown they cut their way out of their victim and spin separate cocoons, sometimes singly but more often in clumps. A good example of the work of the *Chalcids* which have been introduced on the Black and Brown Scales, can be observed by closely examining these scales, as the exit holes made by the adult parasite after having destroyed its host can be seen. The *Braconids* are a further sub-division, being smaller and very often microscopic, usually attacking aphides and mites such as the *Cabbage Aphis*, etc. They also attack larger insects such as caterpillars and cut-worms. Sometimes from a single caterpillar or cocoon hundreds of these tiny insects may be bred.

The mode of attack of these internal parasites varies. Sometimes the eggs are deposited on the outside of the insect attacked, and on hatching eat

their way through the skin of their host and begin at once to feed, when full-grown, cutting their way out, leaving it dead. Often caterpillars can be seen with numbers of these tiny white cocoons attached to their deal bodies. They may also be found in clusters on twigs, grass, or weeds, and should never be destroyed.

Other species attack by means of their ovipositor at the rear of their bodies, the host being pierced and an egg deposited within the body. The young larvæ, when hatched, at first feed upon the non-vital parts. The insects attacked continue to feed and grow, eventually pupating or spinning a cocoon. The parasites within then attack the whole of the organs and destroy what would have otherwise produced a fly, moth, etc., using the cocoon or pupa shell to pass through their various stages, eventually cutting their way out as one or more beneficial parasites.

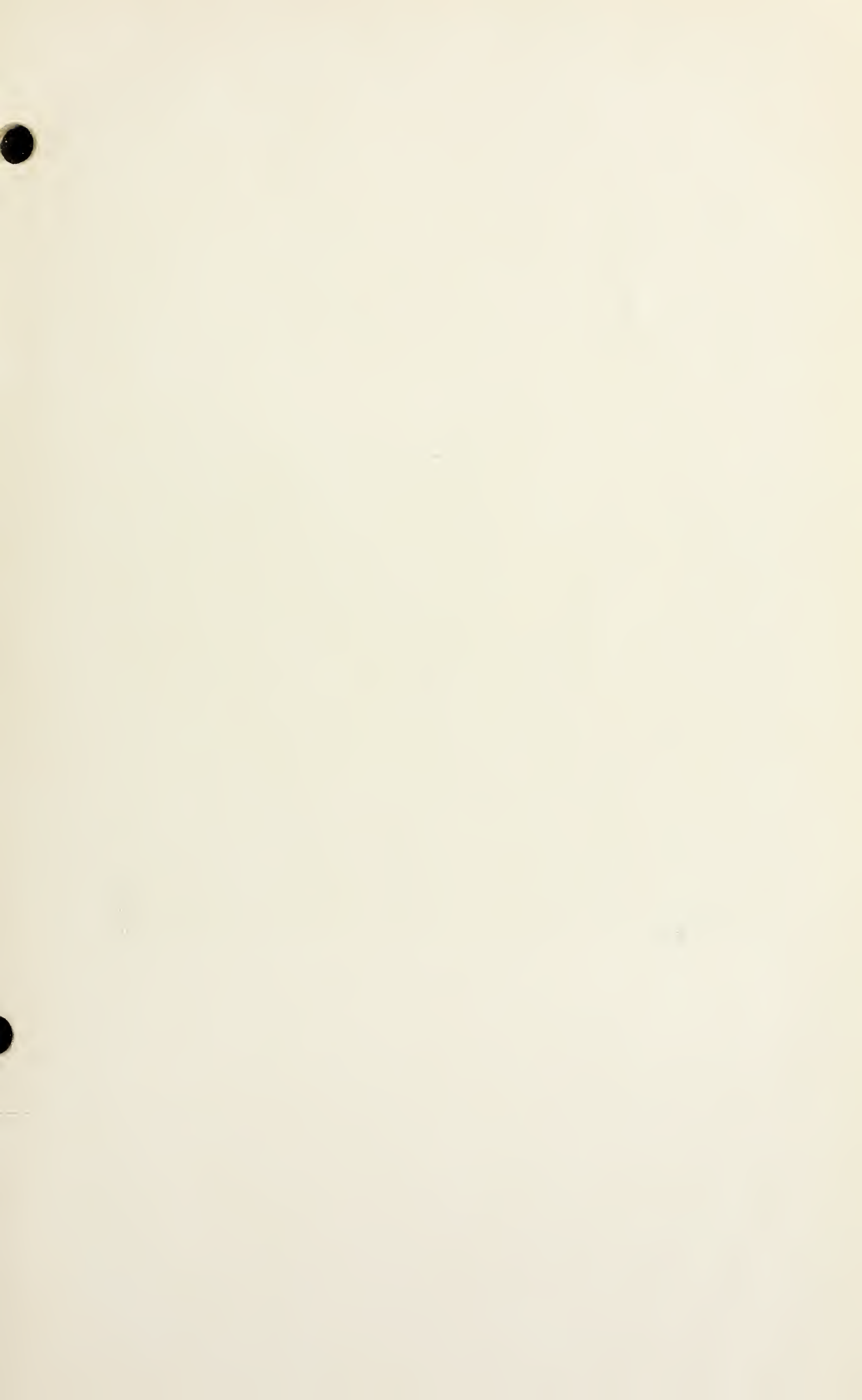
The *Dipterous* parasites are mostly known as *Tachina flies*, and are shaped and coloured much like our common house-flies, but are usually larger and heavier bodied. The females place their eggs upon the surface of the skin of caterpillars and many other larvæ which feed in exposed positions. The eggs are of a whitish colour, adhering tenaciously when once stuck upon the victim; as the parent fly takes especial pains to place them on parts of the body of the larvæ where it cannot reach them, the eggs are probably seldom displaced. From these eggs young maggots soon hatch, eating their way downwards through the shell of the egg and through the skin of their host into the fatty parts of the body, upon which they subsist, after the manner of the young hymenopterous larvæ. The empty shells of the attached eggs cover the wounds caused by the maggots eating through the skin, thus saving the life of the victim for a still worse fate. Caterpillars are often attacked by myriads of a species of *Tachina*, and pursued on the ground, often four or five flies being engaged in chasing a single caterpillar.

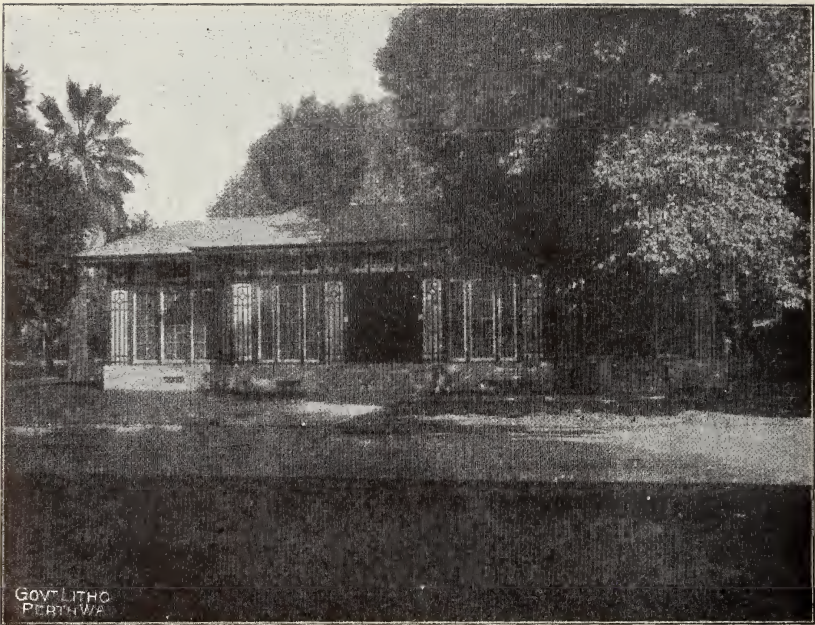
Tachina flies are generally rather large for their class, robust in appearance, always bristly, and sometimes formidable looking from the array of sharp, shiny points projecting in every direction from their bodies.

Predatory insects are those which live upon their prey and not within, such as the ladybird, syrphus fly, etc. The ladybird is perhaps the most commonly known beneficial insect, but strange to say is seldom known in its larvæ or maggot stage, which is its most useful period. The larvæ are usually black and marked with yellow or brown bands across the middle, and is armed around the edges of the body with many soft, long, branching spines. The larvæ usually feed upon the young, while the adult beetle prefers the full-grown female insect.

The syrphus flies usually are gaily coloured, and may easily be mistaken for small bees. Their maggots, which are blind, are particularly fond of plant aphides, causing great destruction of these prolific pests. The eggs are deposited among the swarms of aphides, and the young maggots as soon as they hatch begin to feed upon them. As the maggots grow in age and size they move about among the former and seize one and another of them, sucking out the juices from their bodies, leaving only the empty skin. These maggots are footless and eyeless, of wrinkled, flattened form, very pointed at the anterior and blunt at the posterior extremities.

The method of fighting insect pests with their natural enemies was first put to practical test in the year 1888. It happened that a number of citrus trees were sent from Australia to California about the year 1868. These trees contained some unparasitised specimens of the Cottony Cushion Scale (*Icerya*





California State Insectary.

purchasi Mash). They at once began to increase; the young trees were sold and sent to different parts of the State, and by that means the pest was unknowingly spread. Nor did it confine itself to the citrus trees; many varieties of fruit and ornamental plants were attacked and destroyed. It even found its way to forest trees, and for some time it looked as if it would reduce the whole country to a desert. Orange growers were in despair. From 8,000 car-loads (equal to 300 cases per car) the shipments dropped to 600 car-loads in one year, thus showing the terrible effects of the pest. Every possible remedy was tried, but none was found effective, and even the most costly served only to temporarily check the spread of the pest. Citrus growers were digging out and burning their trees, but even this drastic process did not avail, for had all the orchards been destroyed there was sufficient wild plants to keep it going.

This pest defied all artificial remedies, and in the year 1888 the Hon. Frank McCoppin, Chairman of the American Commission to the Melbourne Exhibition, was induced by the Californian authorities to take along with him to Australia Professor Albert Koebele for the purpose of investigating why this insect was not a pest in that country. Here he discovered the little lady-bird *Novius cardinalis* and the internal parasite *Lestophonus icerya*, which completely held the Cottony Scale in subjection. Professor Koebele at once collected a number of these beneficial insects and forwarded them to California, where they arrived in fairly good order and were placed in the very heart of the infested area. They at once began to multiply and spread in all directions, very soon bringing this terrible scourge under control. This splendid result set the Californian people thinking, and they naturally formed the common-sense opinion, that if one pest can be so effectively handled by searching out its natural enemies, it should be possible to treat other pests in the same way. It is a well-known fact that insects which become a pest are those imported into new countries without their natural checks.

Immediately upon the success of the introduction of the parasites of the Cottony Cushion Scale, the Hawaiian Government engaged Prof. Koebele to take up the work of searching for the natural enemies of the various pests attacking the sugar-cane and coffee plantations. California has also made provision on their estimates for the continuance of this work up to the present date. During this period of 21 years the Californian Horticultural Commission had never been in a position financially to erect a proper insectary in which to propagate the various colonies of parasites forwarded from abroad by their agents or collectors. One of the first acts of the present State Commissioner of Horticulture, Mr. J. W. Jeffery, was to erect an up-to-date insectary in the Capitol Park grounds, Sacramento, at a cost of £1,600. This contains numerous rooms, all fitted with the latest modern heating and cooling appliances, and is also perfectly proof against the most minute insect making its escape. This insectary will now make it possible to introduce many species of beneficial insects, which formerly it was impossible to do on account of the lack of facilities.

Since California first adopted the system of fighting "Bug with Bug" they have accomplished excellent results. The subduing of the Cottony Cushion Scale is now a world-wide known fact. The San Jose Scale (*Aspidiotus perniciosus*), once the most dreaded pest of the deciduous trees, is now entirely controlled by its internal parasites *Aphelinus fuscipennis* and *Aspidiotophagus citrinus*. The Yellow Scale (*Aspidiotus citrinus*), also a very

serious pest at one time to orange growers, is now considered there as harmless, owing to its internal parasite (*Aspidiotophagus citrinus*). The Brown Apricot Scale (*Lecanium armenicum*) is also held in subjection by its parasite (*Comys fusca*). The Black Scale (*Lecanium olea*), which was such a serious pest of the olive and citrus industry, has had introduced upon it the South African *Sentellista cyanea*, which at one time gave promise of bringing this pest below the danger line; but being an egg parasite only, it has not done all that was expected of it. It was found that even after the *Sentellista* had matured on the eggs of the scale, it had not destroyed the parent which would in many instances continue to lay eggs, and thus produce a fresh batch of scale. These in turn would be attacked by the *Sentellista* only when they had reached maturity and again begun to lay their eggs, in the meantime having done considerable damage. What is now wanted in California to make a complete success is a body parasite, which is now being introduced into that State.

The Soft Brown Scale (*Lecanium hesperidum*), once a serious pest, is now controlled by its internal parasites (*Coccophagus lecani*, *Comys fusca*, and *Encyrtus flavus*).

Red Scale (*Aspidiotus aurantii*) is now the most serious pest of the citrus growers. The attention of the authorities is therefore directed to the introduction of as many internal parasites of this pest as can be obtained. Mr. Compere has forwarded several specimens from the Orient which are being propagated in the insectary and distributed. A great many of the other garden pests, such as Cabbage Aphis, Cut-worms, etc., are all controlled by their various parasites. To quote the words of Mr. Maskew in speaking at the Thirty-fourth Fruitgrowers' Convention, Riverside, California, 28th April, 1908:—"The status of parasitism in the great melon fields is arriving at a stage of commercial completion. In the vegetable gardens and berry fields parasitism is approaching approximately commercial control." The State Commissioner of Horticulture, Mr. J. W. Jeffrey, also declares, in a letter to this Department, "That without the vast amount of work being done by native and imported beneficial insects in the State, it would be impossible to raise a majority of our commercial crops."

In the Hawaiian Islands so great results have been achieved as in California. Take for instance the introduction of the Australian ladybird (*Cryptolaemus montrouzieri*), which cleared the sugar plantations of a species of mealy bug which had caused a great annual loss to the planters. Then the parasite of the cane-leaf hopper from Queensland was introduced with wonderful success. This is a very small species of *Chalcid*, and is an egg parasite. The planters of Hawaii claim that this insect has been worth a million and a-half dollars to them per annum. The species of Wax Scale, which at one time was so bad in the Islands, has been controlled by the introduction of a parasite from Japan. Many more minor pests have been treated likewise.

Now I come to our own State. It is close on seven years since this State took up the method of fighting insect pests with their natural enemies. A compact was entered into with the State of California, whereby the services of Mr. George Compere were secured, and the result of his researches and expenses thereof is shared equally by the two States. This arrangement was possible, as the climate and insect pests were very similar, and the respective interests do not conflict. When Mr. Compere first arrived in West-

ern Australia the late Mr. Lindley Cowen was Secretary for Agriculture. He at once drew the Entomologist's attention to the state of the public gardens, which at that time were plastered with scale. Mr. Compere inspected them and found the cause of the trouble was the Black Scale (*Lecanium olea*), which was infesting many trees and shrubs. So bad was the scale that the curator was cutting down numbers of the infested plants. The Black Scale at this time was the worst scale pest in the State, having a very wide range of food plants; in fact many of the native *Zamia* palms and bush were badly infested.

Mr. Compere informed the Secretary that he could, without question, bring the Black Scale, by the introduction of its parasites, into subjection. He was instructed to begin at once, with the result that to-day this scale is considered one of our most harmless forms in this State. This was not accomplished until at least ten internal parasites, both body and egg species, had been received and established.

Then came the problem of the Brown Scale (*Lecanium hesperidum*), another very serious pest of the citrus-growers. This is fast sharing the fate of the Black by the introduction of several species of internal parasites. In fact, it is now so well controlled that orders have been given the inspectors not to fumigate or spray any more in dealing with this scale in orchards. The Mealy Bug (*Dactylopius citri*), also a very serious pest to citrus-growers in many parts of the world, had also become firmly established in this State, but it has been rendered harmless for evil by the introduction of the Ladybird (*Cryptoleamus montrouzieri*). Other species of mealy bug, such as (*Dactylopius longifilis*), a very common pest on garden plants, has also shared the same fate.

The Cabbage Aphid (*Aphis brassicae*), a very serious pest to cabbage-growers in many parts of the world, and which in this State had become so serious that many growers stated that it was almost impossible to grow cabbage, kale, or Swede turnips. This condition of things has been changed by the introduction of internal parasites, the last one, an importation from Ceylon, proving itself to be the best yet established on this pest. The Diamond-backed Cabbage Moth (*Plutella cruciferarum*), also once a most serious pest of the cabbage-growers, has been greatly reduced by the introduction of parasites, and we have within the last year established another species which will still reduce its power of destruction.

Red Scale (*Aspidiotus aurantii*). This is without doubt the most destructive scale insect in the State. It has a very wide range of food plants. It attacks all varieties of citrus, also quince, pear, apple, fig, loquat, mulberry, castor bean, roses, and many other garden plants and native shrubs. In the latter part of 1905 Mr. Compere brought from the Orient some red scale parasitised by a small yellow species of Chalcid fly, from which some fifteen issued. These were put in another cage containing two small trees infested with Red Scale. The trees were placed in a Perth garden badly infested with this scale, and it was soon noticed that the little parasite had become established. Many colonies of these insects have been distributed, and where they have become established, good work is reported. But it has been clearly demonstrated that a single species of parasite would not in itself be able to bring this scale into subjection. To this end Mr. Compere again turned his attention to the matter, and upon his recent return to the State, brought with him no less than six new species of internal parasites of this scale. These

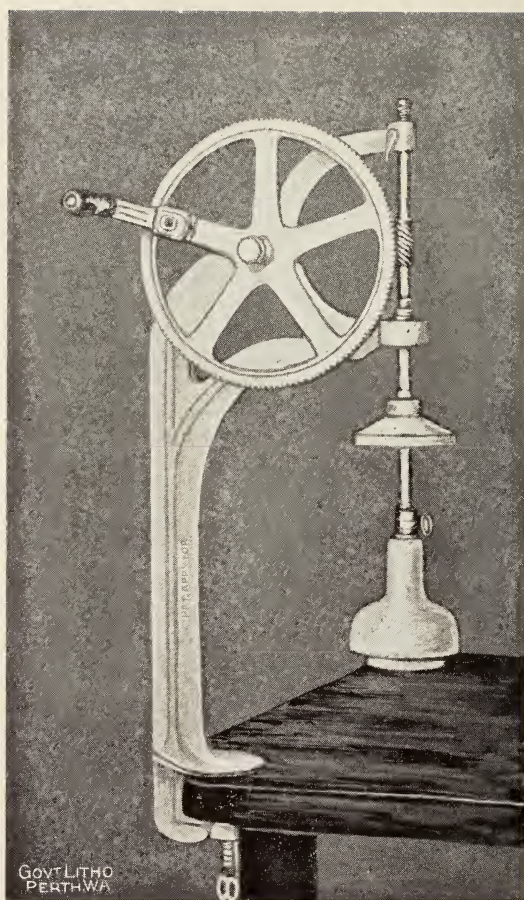
are issuing in large numbers, and can be seen ovipositing in fresh local scale. It is to be hoped that when these new arrivals have become established that they will give as good an account of themselves as have those imported against the Black and Soft Brown Scales.

The Fruit Fly (*Ceratitis capitata*). This is undoubtedly the most destructive fruit pest we have to deal with in this State, and in fact in any fruit-growing section of the world where it has become established.

The work of successfully introducing the parasites of this pest has been very difficult on account of the seasons where they are obtained being opposite to ours. At last Mr. Compere was successful. This entailed a lot of anxious work, as the parasitised pupa had to be carried over 60 days on ice to tide them over the period between the Indian fly season and our own. They arrived in good order, and within twelve days of arrival began to issue. The parasites were at once placed in breeding cages, and maggot infested fruits supplied. In a short time we were breeding them out by the thousand. Two species predominated, one a Braconid and the other a small species of Chalcid fly. These have been distributed extensively in fly infested areas. Up to date it is hard to make any definite statement as to the amount of good accomplished, but seeing that they have only been in the State a little over 15 months it is hardly fair to expect too much. Numbers of pupae have been collected from orchards where the parasites have been liberated, and proved to be parasitised. However, there is still plenty of work for them to do, and it may be that we shall have to seek further parasites on this pest before it will be reduced below the danger line. This has been our experience in combating other pests. Many insects that were imported three and four years ago, and given up as failures, are now turning up in strong force. We are still on the lookout for further parasites, and hope to be able to establish those known to exist in Brazil, and which have been credited by Mr. Claude Fuller, Government Entomologist of Natal, with destroying 60 to 70 per cent. of the maggots, an excellent result by itself. Previous to the Indian species being established here Mr. Compere obtained some of these Brazilian parasites, but owing to the long distance and opposite season, was not successful in establishing them. This was one of the reasons Mr. Compere was so anxious that Queensland or New South Wales should co-operate with this State, as the fruit fly is in existence in those States all the year round, and they would have been splendid countries to establish them in, besides the benefits they would have derived by having the parasites established there. Western Australia would then have been able to obtain them from there when our fly season came round.

In conclusion, I can truthfully state that up to the present juncture the work of introducing parasites into this State has been most successful. It is impossible to place a monetary value on these insect friends. Take a single instance, the Black Scale, this has not only been checked for the present but for all time, as once a parasite is established in a country it is permanent, and the cost of labour, time and spraying is also saved for all time.

It is the policy of this State to use artificial remedies so long as there are no better ones, but to secure, introduce, and distribute the better means, and these consist of beneficial insects; and in view of our past success in this work we look forward hopefully to the future. To show the feeling of local agriculturists towards this method of combating insect pests, the following resolu-



The "Empire" Churn.

tion was carried at the Agricultural Conference, Perth, 26th August, 1908:—
Moved by Mr. Duce: "That the parasitic method of fighting insect pests was of practical value, and that the Government should instruct Mr. Compere to use every effort to secure an efficient parasite for the Woolly Aphis."

In support of the resolution Mr. Duce said he knew of the efficacy of parasites and defied anyone to find a live scale amongst his trees.

Mr. Reid seconded, and stated that the growers in his district had the utmost confidence in the work that Mr. Compere was doing.

The resolution was carried.

THE EMPIRE CHURN.

Whilst at the Franco-British Exhibition, Mr. Percy G. Wicken obtained an "Empire" churn, together with pamphlets containing instructions for its use. This was forwarded by the Department to Brunswick State Farm for trial, and to compare its working with the "Cherry" churn. Mr. Gull, the farm manager, has submitted the following report on the machine, an illustration of which is here given also:—

"Regarding the merits of the "Empire" churn you forwarded here a little while back, I beg to give you the result of a trial I have just made, and also that of the "Cherry" churn. In the former we had eight pounds of cream, and in the "Cherry" sixteen pounds, this was necessary, as with only eight pounds (being a larger vessel) there was not enough to catch the beaters properly. The temperature in both cases was the same—about sixty degrees. In the "Empire" the butter came in four minutes and there were 4lbs. The "Cherry" was six minutes, and made 8lbs. 4ozs. of butter, so that there were 2ozs. in favour of the latter. The "Empire" was very hard to turn as soon as the cream thickened, and in my opinion it is more suitable for making a quart or two quarts of cream up, than for a larger amount. This machine, I believe, is one of the smallest, and, I think, could not be beaten for making butter in a small way, and should be a lot cheaper than the smallest of the "Cherry" churns. I notice in the pamphlet sent me by Mr. Wicken that it claims to have made $2\frac{1}{2}$ lbs. of butter from a quart of cream, but a quart only weighs that, so that it must have been 100 per cent. butter fat. In conclusion, I would say that it was a very good churn to recommend for family butter making."

WATER CONSERVATION.

AGRICULTURE IN DRY DISTRICTS.

(By NOEL M. BRAZIER.)

Mr. Noel M. Brazier, who was recently commissioned by the Western Australian Government to investigate the methods of water conservation in the Eastern States, has submitted the following report to the Under Secretary for Agriculture:—

"In accordance with your instructions to investigate methods of dam-making and water conservation in the Eastern States, I paid a visit to the Mallee country, west from Onyen, and about 60 miles south of Mildura, in about the 11in. rainfall belt. I was accompanied by Mr. A. S. Kenyon, Engineer for Agriculture, and Mr. J. S. Dethbridge, Deputy-Chief Engineer of Water Supply. These gentlemen were making the preliminary arrangements for the construction of tanks to ensure a three years' water supply for the settlers who would eventually occupy this part of Victoria.

Operations in the Mallee.

"The country to be opened up by tanks is a belt of mallee extending west to Pinaroo, in South Australia, where a system of bores is being carried out by both the South Australian and Victorian Governments, and to which I shall refer later. In the open country the grass is very good this season, and the pine country is similar to Mildura. Hitherto the mallee country has been supplied with water from channels from outside sources or by wells, but as this particular region is remote from the irrigation channels, and wells would not give a sufficient supply in case of drought, it is proposed to construct tanks of not less than 5,000yds. capacity, not less than 20ft. deep, while some of 20,000yds. and over are projected, based on a minimum of 500 cubic yards per square mile of settlement. In favourable instances the total capacity of a single tank may reach 100,000 cubic yards, and it is anticipated that in the event of drought it will be unnecessary to cart water further than five miles. These enormous tanks are intended to last, so far as evaporation is concerned, for a period of three years. They are not intended for the daily use of the settlers, but merely as a stand-by during severe droughts. To achieve this end it is proposed to insist upon each settler providing adequate storage for his own use in ordinary circumstances. Most of these tanks, several of whose sites we visited, will be located in swamps or claypans in which water lies in good seasons a foot or two deep. After the tanks have been filled to surface level it is intended to pump the excess water from outside to within the banks formed by the spoil, which will generally double the capacity as compared with the excavation, due regard being, of course, paid to floodgates, etc. In order to reduce the cost of excavating the large tanks, smaller tanks are first being constructed practically as a supply for the contractors, whilst at intervals also are to be found what are termed 'log' tanks of about 200yds. capacity for immediate use. In Riverina and some of the other States steam appliances have been used in the construction of tanks, consisting of two

traction engines of the Fowler under-drum type, which wind special scoops and ploughs to and fro. It is claimed that large tanks are thus excavated for from 2d. to 4d. per cubic yard. In Victoria so far horse and bullock teams, principally the former, are used. The price for small tanks privately constructed is about 4d. per yard. At one tank that was being cleaned out at the time I saw four horses pulling a half-yard scoop. The cost of the large tanks (public tanks) of 10,000 yds. and over will be about 8d. per yard, inclusive of trimming the spoil banks where such tanks are used to retain water above the natural surface. The maintenance of these tanks and the cost of pumping the water into the raised level will be undertaken by either the State Rivers and Water Supply Commission or local bodies. All roads in the area being operated upon are cleared 25 links wide. The cost of this work and the construction of the tanks is added to the price of the land. So as to assist settlement this small charge is spread over a term of 40 years, without interest. Where an equivalent amount of additional improvements is put on the land these small payments are suspended during the first three or four years. Steps are also being taken to provide means of making advances to settlers. Although the latitude of this belt of country is just about that of Albany, namely, about 35deg. south, were it not for the provision made it would not be possible to get a drink of water, nor do I think it compares more favourably than our eastern goldfields as far as the soil is concerned; while the clearing is certainly heavier and the rainfall little or no better. While travelling through this country and learning of the efforts being put forth to open it up, at a distance of about 300 miles from Melbourne, it certainly reminded me of my first trip to the goldfields in 1892, when I reported that I considered I had seen some of the best wheat country in Australia between Southern Cross and Coolgardie. Certainly over this area one passes some of the dreariest waste, but the mallee country also contains good land in belts, as well as patches equally desolate as the Boorabbin sandplain.

"The thoughts that naturally arise in considering the Victorian method of development are:—(1) Has sufficient attention been paid to the conservation of water in our drier districts? (2) In the event of tank-sinking having to be resorted to, will any resumption of land be necessary?

Agriculture in Western Australia.

"The mere selling of land to intending settlers does not necessarily indicate that the development of our agricultural resources is being stimulated. For unless those difficulties that must arise in either the wet or dry districts are combated prior to settlement in a systematic manner and on a comprehensive scale, at a minimum of cost, the development of agriculture must be retarded. It would certainly be wise to make full investigation into the matter of water supply for the very extensive areas now being dealt with in the Eastern Districts before alienation. If sites for specially large central storage tanks possessing suitable holding ground could be found within reasonable distance of the pipe-track, but with little or no catchment area, these tanks could be filled during the winter overflow period from the Mundaring Weir at a practically known cost. Without this knowledge, or some assurance that an adequate water supply could be obtained in some manner, it would be criminal to sell land only to subsequently discover that sufficient water supply was not available to the purchaser. The regularity of our rainfall makes the possibility of saving a certain amount of water assured, even

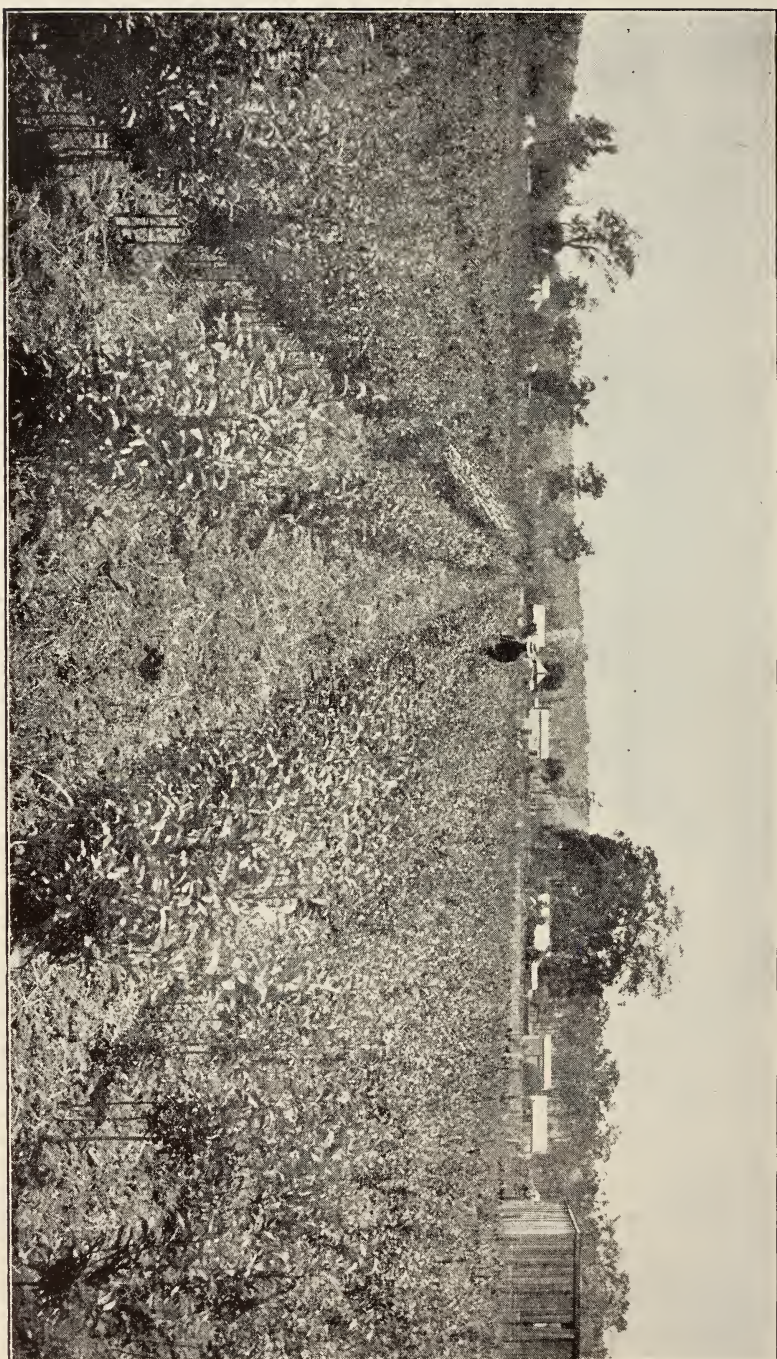
if the use of cemented tanks is resorted to. The best and cheapest methods of ensuring this supply should be ascertained previously to alienation. Our object should be not to sell land in order to be able to point to large areas being occupied, but to make their occupation profitable by the shortest and easiest channels—whether in the dry, easily-cleared country, or the wet and heavily-timbered portions.

Boring.

"In both South Australia and Victoria the water supply for the settlers in the belt of country in which Pinaroo is situated is secured by a series of bores. In South Australia central bores are put down to supply the settlers until such time as they can put down their own bore, while in Victoria a more comprehensive system of bores is being put down in what is described as 'well country' prior to settlement. Although it is doubtful if this system of obtaining a supply of water would be suitable to Western Australia on the eastern side of the Darling Range, a description of the system and cost might be interesting from the fact that Pinaroo has been transformed from a waste into a thriving centre in a few years. The plant used by the South Australian Government for boring from 500 to 700 ft. is acknowledged to be the best, and is of the walking beam, cable-rigged pattern, portable on four large wheels, with vertical derrick and guide. It folds down for transport, and was designed by Mr. A. R. Johnstone, Box 250, G.P.O., Adelaide. The Victorian Government carry in the body of their machine an ordinary 5-6 b.h.p. oil engine, which drives various winches. Mr. Kenyon informed me that the total weight was over five tons and the cost over £500. It takes six horses to pull the machine on bad roads. The machine can also wind itself from tree to tree at a very slow speed. The bores generally carry 5in. best quality Scotch or Belgian casing, costing 2s. 3d. per foot. The working cost in average country is 2s. per foot, but allow 1s. 6d. for contingencies. Of course, rock increases the price. The bores are then fitted with 30ft. x 12ft. windmill, driving a pump with a maximum capacity of 1,200 gallons per hour, but with a general delivery of 1,000 gallons per day. The cost of the 250ft. of pipe and rod is about £60, without erection. The 2,000-gallon tank, on an iron stand, fitted with trough and connections complete, costs about £20. The general average of the bores on the Victorian side is 250ft. Ordinary tools are used, but the under-reaming patents are considered best, and are generally obtained from Clutterbuck Bros., Adelaide, and the Union Engineering Co. The wages paid are:—Foreman, 12s. per day; assistant, 10s.; two drillers, 8s.; general, 8s.; and in easy country they can work two shifts a day. Mr. Graham Stewart, of South Australia, informed me that he put down two bores, each 330ft. deep, with 6½in. casing, and that one cost 15s. per foot complete and the other only 10s. per foot, as there were no accidents. Mr. Stewart recommended that a 12 b.h.p. oil engine should be used on the boring machines, and gave me the cost of a boring plant to bore from 1,000ft. to 3,000ft. or 4,000ft., at £1,500 sterling, using one Blackstone engine. In South Australia the Government supply settlers with a hand-boring plant on easy terms at very reasonable cost, and if it were considered advisable to test our dry country in this way for water one of the hand-boring plants would be the cheapest and the best to make a start with.

"Before leaving this subject of boring I would like to mention that during a conversation with Mr. Jones, Secretary to the Commissioner of Public





Young Apple and Japanese Plum Trees for 1909.—Hawter's Nursery.

Works, South Australia, he said he did not think the Western Australian Government should be too sanguine about obtaining water on the Premier Downs or Nullabor Plains, on the transeontinental railway route, as although water had been obtained at Eucla in sand, and appeared to be artesian, the result from their inland boring proved that the water coming from the inland ranges had its outlet at sea level. The water in the whole of their bores down to 800ft. and about 600ft. below sea level only rose to sea level, and was very brackish. As this appeared to me to be a matter worth consideration I merely mention it in case the P.W.D. in its operations had not been in touch with events in South Australia."

ORCHARD CULTIVATION.

MR. J. HAWTER'S NURSERY.

The suitability of the South-West districts for the fruit-growing is a fully established fact, and the many large and small flourishing orchards to be met with prove the future possibilities of a great and valuable industry, active in all its branches. The extent to which planting is being carried out by settlers is evidenced by the output from the many excellent nurseries established in the State. Not the least of these is the well-known Blackwood nurseries of Mr. J. Hawter, of which there are branches at Harvey and Smith's Mill. Mr. Hawter's descriptive catalogue for the present season, of fruit trees, rooted vines, ornamental plants and trees, roses, etc., is quite an interesting volume, and a good guide for the planter of a new orchard. Besides the strict inspection by the Department's inspectors under the Insect Pests Act, Mr. Hawter, as a further guarantee, states that all fruit trees, before leaving the nurseries, are fumigated by hydro-cyanic gas which is an infallible remedy for all insects without injury to the trees. Immense stocks of many varieties of trees are raised in his nurseries. The accompanying illustration shows a nursery of young apple and Japanese plum trees for this season.

THE CODLIN MOTH.

The Chief Inspector of Orchards reports that the Codlin moth inspection for this season has been completed, after very careful watch in the different areas, without finding any traces of the pest. This satisfactory condition applies to St. George's Terrace and other metropolitan places. It is two years since the last Codlin moth outbreak in St. George's Terrace, four years since it was stamped out in West Perth, and five years since it was dealt with satisfactorily in the Albany district. The pest appears to have been completely destroyed in each of the above centres, and this State may be regarded as absolutely free from Codlin moth.

PIMELEA ROSEA.

Dr. A. Morrison, Botanist, has furnished the following report on a specimen of *Pimelea rosea*, which came from the teacher of the Wannerup State school, as to its economic values and whether it can be successfully cultivated:—

“The native *Pimeleas* have a remarkably tough, strong, and pliable bark, and both in Gippsland and in the southern districts of this State it is stripped from the shrubs, and used as cordage in an emergency. Mr. W. R. Guilfoyle, Director of the Melbourne Botanic Garden, prepared samples of the fibre from the bark of a West Australian plant (*Pimelea clavata*), as well as that of a Victorian species, and exhibited them at the Melbourne International Exhibition of 1888, describing that of the western plant as a very fine bark.

“I have no doubt that the plants could be successfully cultivated in this State if the natural conditions surrounding them were maintained. If, however, these conditions were not kept up or compensated they might not succeed if, for example, they were grown in a dry soil and exposed to drought, the plants might reach a height of only two or three feet, or less, and prove of little use.

“The fibre of this plant would doubtless be of great value, but fibre plants are so numerous that the practical question of the cost of cultivation and preparation of *Pimelea* fibre, as compared with others, would have to be carefully considered. Experimental cultivation would be necessary to settle these matters, but in this instance the fibre might be found to possess qualities of such excellence that its production, even in limited quantities, might prove commercially payable.”

WESTERN AUSTRALIAN GRAPES IN MELBOURNE.

At the beginning of April the Department forwarded a consignment of grapes—Almeria, Purple Cornichou, Flame Tokay, and Santa Pasta—grown in this State, to the Agency in Melbourne. Mr. R. L. Gilbert, Officer-in-Charge, reports that the fruit arrived in perfect condition and attracted much attention, and also received the highest opinion from two leading South Australians. Mr. Gilbert suggests that future shipments of grapes should not be put in cold storage on shipboard, as their natural freshness and bloom are longer preserved without it. With cold storage the fruit, soon after thawing, lose their fresh appearance, and the stems wither. The Almeria grapes above mentioned, however, looked as fresh at the time Mr. Gilbert wrote as if only just off the vines.

WHEAT-GROWING ON EASTERN GOLDFIELDS.

Mr. F. W. Bow, of Coolgardie, has written the following interesting letter to the Under Secretary on the progress of wheat-growing on the Eastern Goldfields:—

“I have cleared, ploughed, tilled, and sown 330 acres of land. Commenced clearing on July 6, 1908, finished sowing on April 6, and to-day (7th) it is raining a nice steady, soaking rain; it is very fortunate indeed, as I only locked the gate of the farm late last night. Within one week from now the whole 320 acres will be up and forging ahead and will continue to do so with only the ordinary rainfall. I have been tilling and dry-farming the whole piece during the summer months; consequently, I have already a fair percentage of moisture stored beneath the surface and which must later benefit the crop considerably when the roots have bored sufficiently deep to reach it.

“I have sown the following varieties of wheat without any manures whatever:—Baroota Wonder, Alpha, Comeback, Smart's Early, and Steinweidel. I have each variety carefully pegged and noted so as to ensure proper results from each as a hay-producer. I have also sown $3\frac{1}{2}$ acres virgin land without ploughing as an experiment and shall watch the result. Having a quantity of seed wheat left, I have decided to cultivate 20 acres of stubble land and then drill it in without ploughing. The result will be carefully noted.

“The majority of the people here who intended sowing this season have done so, with few exceptions. I estimate that there will be about 1,000 acres under crop within a radius of 20 miles of Coolgardie.”

PUBLICATIONS RECEIVED.

Some important Factors in Production of Sanitary Milk—(U.S. Department of Agriculture).

Milk and its Products as carriers of infection—(U.S. Department of Agriculture).

Twenty-fourth Annual Report—Bureau of Animal Industry, U.S.A.

Common Colics of the Horse—Caulton Reeks.

Indian Forest Memoirs, Vol. I., Part II.

Forest Pamphlets, 4 and 5 (India).

Shellac and Lac Cultivation (India).

Inheritance in Silk-worms (Stanford University).

Annual Report Transvaal Department of Agriculture, 1907-8.

Report of Dairy and Cold Storage Commissioner, 1908 (England).

GOVERNMENT LABOUR BUREAU.

APRIL REPORT.

Mr. James Longmore, Superintendent of the Government Labour Bureau, reports as follows on the operations of the Bureau for April.

Perth.

Registrations.—The total number of men who called during the month in search of work was 737. Of this number 312 were new registrations and 425 renewals, *i.e.*, men who called who had been registered prior to the month of April, and since the 1st July, 1908. The trades or occupations of the 737 applicants were as follows:—Labourers 229, farm hands 98, handy lads 75, handy men 55, cooks 29, carpenters 22, bushmen 16, gardeners 16, grooms 15, miners 15, hotel hands 13, painters 9, station hands 9, fitters 8, dairymen 7, engine-drivers 7, butchers, drivers, strikers 6 of each, blacksmiths, clerks, joiners, stewards, survey hands 4 of each, engineers, firemen, ironmoulders 3 of each, caretakers, grocers, orderlies, orchardists, waiters, warehousemen, wheelwrights 2 of each, and 53 miscellaneous.

Engagements.—The engagements for the month totalled 273. The classification of work found was as follows:—Farm hands 54, bushmen 52, labourers 40, sawmill hands 23, handy lads 16, handy men 15, lads for farms 14, cooks 10, woodcutters 5, carpenters, fencers, miners, station hands 4 of each, hotel hands, survey hands, and yardmen 3 of each, coal trimmers, dairymen, grooms, kitchenmen, teamsters, stewards 2 of each, and 7 miscellaneous.

Fremantle.

Registrations.—The new registrations were 8 and the renewals 12, total 20. The classification was, *viz.*, labourers 12, clerks 2, handy men 2, and carpenters, gardeners, machinists, and plasterers 1 of each.

Engagements.—There were 5 engagements, *viz.*, labourers 4, orchardists 1.

Northam.

Returns not to hand.

Kalgoorlie.

Registrations.—During the month there were 36 new registrations and 15 renewals, total 51. The classification was, *viz.*, labourers 11, handy men 8, handy youths 7, miners 7, yardmen 4, blacksmiths 3, fitters 3, engine-drivers 2, and 6 miscellaneous.

Engagements.—The engagements were 5, *viz.*, miners 2, handy men, kitchen men, and labourers 1 of each.

The female servants who called numbered 18. There were 14 new registrations and 4 renewals. The classification was, *viz.*, cooks 5, generals 4, housemaids 3, waitresses 2, light generals 2, kitchenmaids and charwomen, 1 of each. There was one engagement—a light general.

Women's Branch, Perth.

Registrations.—The new registrations for the month were 59, and the renewals 66, total 125. The classification was, viz., laundress-charwomen 28, generals 22, cooks 16, housemaids 15, light generals 13, housekeepers 10, useful girls 7, ladyhelps 3, waitresses 3, governesses 3, nursemaids 2, married couple, needlewomen, cook-laundress 1 of each.

Engagements.—There were 65 engagements, classified as follows:—Laundress-charwomen 38, generals 12, light generals 5, cooks 4, useful girls 3, housemaids, kitchenwomen, and ladyhelps 1 of each.

General Remarks.

The number of individual men who called at the central office, Perth, during the month in search of work was 737 as against 771, or 34 less than that for the corresponding month of last year. The engagements for the month (273) being 11 short of the total for the month of April, 1908. During the month there were 134 men assisted by railway passes from the central office, Perth. The fares refunded totalled £81 2s. 6d., and the sum of £9 8s. was received from employers for payment of fares to send workers, the whole amounting to £90 10s. 6d.

DATES OF AGRICULTURAL SHOWS.

The undermentioned dates have, under the constitution of affiliation, been fixed by the Royal Agricultural Society of Western Australia as governing body for the various agricultural shows during the year 1909:—

Northam, September 28 and 29.

Irwin, September 29.

York, October 5 and 6.

Greenough, October 6.

Beverley, October 8.

Pingelly, October 12.

Toodyay, October 13.

Geraldton, October 13 and 14.

Narrogin, October 14.

Wagin, October 19.

Katanning (National), October 21, 22.

Moora, October 22.

Kelmscott, October 25.

Williams, October 26.

Swan, October 27.

Murray, October 30.

Perth, Royal, November 2-6.

Kojonup, November 10.

Cannington, November 15.

Bridgetown, November 25.

Bunbury, January 12, 13.

GARDEN NOTES FOR JUNE.

By PERCY G. WICKEN.

The month of May, in the early part of which these notes have to be written, started very favourably for agriculturists, being ushered in by a fine fall of rain. This rain came at a time when the seeds which started growth after the rains in the beginning of April were just feeling the need of it, and so far the season promises to be a very favourable one. Those who started to prepare their land after the first rain will now be able to sow seed with the prospects of the young plants making good growth before the ground becomes cold. If the land has been properly dug and well mixed with stable manure, or well rotted garden refuse, the soil will soak in every drop of the moisture and retain sufficient for the use of the plants, while if the ground is drained or has a good subsoil the surplus moisture will soon soak away. Draining is most important to the garden; it is useless to spend money in fertilisers and labour in preparing the ground if stagnant water is allowed to remain about the roots of the plants. Very few plants will stand stagnant water, and if the subsoil is not sufficiently porous to allow the water to get away, a system of drains as described in previous issues of the *Journal* must be installed. In the event of underground draining being out of the question, good deep open drains should be made to carry off the surplus water, but these are not so satisfactory as a system of wooden or pipe drains below the surface.

The question of what fertilisers to use should also be decided and the fertiliser thoroughly mixed with soil before sowing the seed. Some plants, such as cabbages and cauliflowers, silver beet and spinach, are gross feeders and require liberal application of nitrogenous fertilisers in a soluble form; plants of the leguminose order do not require nitrogenous fertilisers, but benefit from the application of superphosphate and potash. Potatoes require the liberal application of a complete fertiliser, while mangel-wurzels benefit by the addition of salt to a complete fertiliser, and can be grown on a somewhat salty soil. Highly soluble fertilisers such as nitrate of soda, sulphate of potash, etc., should not be applied until the plant is sufficiently grown to be able to make use of them. The best system is to sow part of the fertiliser at the time of seeding and the balance later on when the plants have made a good growth and got their root system developed; they are then able to use the fertiliser as soon as it is available. To grow vegetables to perfection abundance of well-rotted farmyard manure is necessary. It should be well rotted for the reason that when in this condition the nitrogen, potash, and phosphoric acid which it contains are in such a state that the plant can make use of them at once. It should be remembered that of the excrement of animals the liquid portion is the most valuable; this part is generally wasted, but if it can be run into the manure pit and added to the farmyard manure it makes it of much more value as a fertiliser.

Artichokes (Globe) may be planted out at any time for the next few months. Suckers from old plants will make quick growth, or young plants raised from seed may be used if the soil is good and has been well manured, the plants should be put in 3ft. apart each way.

Asparagus.—If the trenches for spring planting have not already been prepared the work should be done at once and a liberal supply of well-rotted stable manure dug into the soil. The beds should not be more than about four feet in width, as this enables the work of attending to the plants to be done without unnecessary tramping on the beds.

Beans (Broad).—These should now be making good growth, and in the early districts be bearing. A further supply may be sown during the month. Plant in rows about 3ft. apart and 12in. apart in the rows.

Cabbage.—All strong, healthy plants should be planted out as early as possible, the thinning out of the seed beds will enable the smaller plants to come on and provide a supply for a second planting later on. Care must be taken when transplanting to put the roots well down into the ground in as natural a position as possible. Plant out seed beds for future use.

Cauliflower.—The early grown cauliflowers are now coming into the market from the market gardens, but those who have not water available are only just able to plant out. Treat the same as cabbages, but supply plenty of liquid manure so as not to keep them growing quickly; they do not recover well after a check in growth. Plant out all young plants and make a seed bed for later plants.

Carrots.—Thin out those already up and keep the rows free from weeds. Sow a few more rows for future use.

Celery.—Plant out in the trenches already prepared such young plants as are ready for transplanting; those that are already growing should be earthed up and care taken that no earth is allowed to get into the heart of the plant.

Leek.—Plant out all the seedlings you have ready. As soon as the plants are six inches high they should be planted out in trenches, first trimming off the roots and cutting back the leaves. Plant in rows 18 inches apart. Sow a supply of seed for future use.

Lettuce.—Set out in beds all the plants that are available and sow a quantity of seed for future use. There are a large number of varieties to select from.

Onions.—Plant out in well prepared soil which has been well manured all the young plants available. The drills should be 12 to 15 inches apart, and the plants from 4 to 6 inches apart in the drills. Make seed beds and raise a fresh supply of seedlings to put out next month. Onions are a profitable crop and worth the attention of farmers.

Peas.—Plant out a large supply of this vegetable, they are always in demand. The medium varieties, such as Yorkshire Hero, Stratagem, and Veitch's Perfection, are the best to sow at the present time. Manure the plants with potash and superphosphate.

Turnips.—Thin out and weed those already up and sow a supply of seed to keep up a succession. Swede turnips may also be sown. Sow in drills 30 inches apart and thin out the young plants to about 15 inches apart in the rows. Keep the ground between the rows cultivated as long as possible until the plants take possession of the soil. Pull the crop as early as possible and before they become woody and tough.

FARM.

The month of May and the early part of June is a very busy time on the farm, as during this period of the year a large proportion of our cereal

crops are sown. It would no doubt be better for the farmer if it could be sown earlier, but with the conditions that the new settler has to work under this is not always possible. Settlers who have been longer on the land and have larger areas cleared are able to fallow their land during the previous season, and can commence their seeding in time to get the advantage of the first rains. This is no doubt the method of wheat cultivation most suited to this climate, and the fallowing system is being extended every year; but it is several years after a new settler has taken up land before he has sufficient land cleared to enable him to take up fallowing on a large scale. In the meantime it is necessary for him to cultivate every possible acre to enable him to raise as much revenue as possible to keep things going while he gets more land cleared, consequently he has generally to crop the same area two or three years running, and cannot start ploughing until the rain renders the ground sufficiently soft; this makes him later with his seeding than he should be, and the ground often gets soft and wet before the work is completed. The season has been a favourable one for the smaller farmer; the fine fall of rain which occurred during Easter time was sufficient to soak the land and enable ploughing to start much earlier than is usual, while the man who had a quantity of fallow land already sown has his crop well forward, and now that this fall of rain has followed early this month with another good downpour the prospects for the coming season are good; but we have to keep the fact in mind that it is often the last two or three weeks before harvest which effect the yield of grain.

Every year a larger area of land is being cleared and brought under cultivation, and the production of wheat is increasing rapidly, but in addition to the increased area the object to be attained is to increase the yield; a 15-bushel crop will prove much more profitable than a 10-bushel one, even supposing that more labour is spent on producing it. The expenses for rent, seed, etc., are the same for one as the other. A 1,000 acre paddock of wheat yielding 10 bushels per acre would give 10,000 bushels of wheat, while at 15 bushels per acre 666 acres will produce the same quantity. If the same amount of labour in preparing the land were expended on the smaller area the result would probably be the same as for the larger area, and the saving of rent, seed, etc., would go to the settler. The points to be kept in mind are: thorough cultivation of the soil, suitable fertiliser, careful selection of seed wheat, and the pickling of same to prevent brunt or smut, which is in some districts a source of serious losses. The pickling of wheat is often neglected, and as the matter is such a simple one there is no excuse for anyone neglecting to take such precautions to prevent smut from attacking their crops. The best way to carry out the operation is to obtain a cask to hold about 50 gallons; put in the cask, say, 30 gallons of water; obtain 6lbs. of bluestone, tie in a small bag and suspend it in the water from a stick across the centre of the cask; it will take some time to dissolve. When it is dissolved place about one bushel of wheat in a wicker basket with two handles, lower the basket into the bluestone solution and swirl round two or three times. Any damaged seed and smut balls will float to the surface and can be skimmed off. After about two minutes the basket can be lifted out and placed on two sticks across the cask to drain and then turned out to dry.

Fodder plants to supplement the native grasses are receiving more attention every season. But settlers who are trying all sorts of new grasses should bear in mind that they will probably, especially in the drier districts, obtain

better results by trying to improve the growth and quality of the native pastures by cultivation and the application of fertilisers than by the introduction of grasses that are not likely to flourish under the conditions of our summer climate. In the south-west corner where the rainfall is heavier and the climate cooler there are numerous exotic grasses which may be cultivated with success.

Field peas should receive much more attention from the farmer than they have done in the past. They supply a very valuable fodder either as green feed or grain and also, being a leguminous crop, help to improve the ground. Barley and tares sown early in the season, or even at the present time, will provide in the early spring a succulent fodder of high-feeding value, and one very suitable for dairy cattle and readily eaten by all kinds of stock, the peas supplying the legumes to the food which is necessary in all well balanced rations. If more than sufficient for immediate requirements is grown, they can be turned into ensilage, or even made into hay and kept until required.

Rape is one of the most valuable plants for sheep feed, and has come largely into use in this State in the past few years. If sown early in the season, it provides a valuable feed for the ewes and lambs in the early spring months, lasts well into the summer, and is available at the time that supplementary feed is most required. The seed should be sown on fallow land so as to get the benefit of the first rain that falls in the season.

The attention of settlers is again called to the provisions of the Fertiliser Act, which makes it compulsory on the vendor to give an invoice certificate with every parcel of fertiliser sold stating the percentage of nitrogen, potash, and phosphoric acid which it contains. In the event of this certificate not being issued, a complaint should be made to the Inspector of Fertilisers in Perth, and any necessary action will be taken.

FLOWER GARDEN AND ORCHARD.

A very large variety of garden seeds can be sown, space and taste being elements in the matter of selection. Seedling annuals and perennials can be planted out; also bulbs, gladioli, etc., for succession. Evergreen shrubs and ornamental trees, roses, etc., should be planted.

Fruit trees in orchard should be planted in prepared locations.

WEIGHT OF FRUIT IN CASES.

The following letter from the Commissioner of Railways is published for general information of readers of the *Journal*:—

“With reference to the question of the standard weight for fruit in cases, I have pleasure in informing you that I have now agreed to carry fruit in cases of a standard size measuring on the inside 26½ inches by 13½ inches by 5½ inches (outside measurements add, say, half-inch to each) at a standard weight of 43lbs. per case. No distinction will be made between hard and soft wood cases so long as they conform to the size laid down. In respect of other sizes of cases, they will have to be weighed and charged for on actual weight as heretofore.

“At the present time fruit in small lots is carried at Class B, actual weight, smalls minimum. I have agreed that this shall be altered to Class B, actual weight, minimum 9d.”

MARKET REPORTS.

GENERAL SUMMARY.

FARM PRODUCE.

Good supplies of chaff have come forward and satisfactory prices have ruled generally since the early part of the month. The following are quotations in the Perth markets up to 13th inst.:—

Chaff.—F.A.Q. to medium, £5 2s. 6d. and £5. Good medium, £4 15s. and £4 17s. 6d.

Wheat.—F.A.Q., lots sold up to 5s. 0½d.

Oats.—Feed, 2s. 7½d.

LIVE STOCK.

Requirements for store sheep are general and competition at saleyards has been active.

Horses.—Little business is reported, sellers being few at this time of the year. Farm sorts to £30.

Sheep.—Good forward stores, up to 16s. 6d.; 2 and 4 tooth wethers, 13s. to 14s. 5d.; weaners, 10s. 6d.; ewes, 10s. to 15s. 6d., according to age; lambs, 11s. 6d. to 16s.

Pigs.—Stores, 15s. to 17s.; prime porkers, 25s. to 30s.; lighter, 22s. to 24s.; weaners, 8s.

METROPOLITAN PRODUCE MARKETS.

Fruit.—Apples: Reinettes, 5s.; Pomme de Reigne, 4s. 6d.; Dunn's Seedling, 4s. 9d.; Hoovers, 5s. 3d.; Jonathans, 5s. 6d. to 10s.; Spitzenberg, 4s. to 7s. 3d.; Five Crowns, 6s. 6d.; other varieties, from 3s. 6d. Quinces, 3s. 9d. Pears: Vickers, 5s. 3d. to 7s. 6d.; Josephine, 12s. 6d.; Winter Nellis, 12s. 3d.; Guavas, quarter-case, 5s. Persimmons, 9s. 3d. Oranges, quarter-case, 4s. Lemons, 8s. 6d. Grapes, kerosene cases: Muscats, 11s. to 12s. 6d.; closed, 6s. 6d. to 7s.; Wortley Hall, open, 9s. 3d. to 9s. 9d. Tomatoes, 4s. 9d. to 9s. 3d.

Vegetables, 4s. 9d. to 8s.; others, 2s. to 3s. Potatoes, 6s. 6d. to 10s. 9d. Pumpkins: I.B., 5s. to 6s.; T.C., 3s. to 4s. Rhubarb, ¾d. to 1¾d. Celery, 1s. 2d. to 2s. 3d.; others, 3s. to 10s. French beans, ½d. to 1¼d. Peas, 3d. to 3½d. Parsnips, 1s. to 1s. 9d. Carrots, 4d. to 10d. Turnips, 6d. to 1s. 1d. Beet, 7d. to 11d. Leeks, 3d. to 4d. Swedes, 1s. 2d. to 1s. 7d.; bulk, 7s. Cauliflowers, 1s. 1d. to 1s. 10d.

Poultry.—Fowls, 5s. to 6s. 6d.; ducks, 7s. 6d.; turkeys: hens, 9s. 6d. to 12s. 6d.; gobblers, 15s. to 17s. 6d. Eggs, 2s. per dozen.

LONDON MARKETS.

Messrs. W. Weddel & Co. report, under date London, 8th April:—

Wool.—Markets have continued firm since the close of the sales here a fortnight ago. With old stocks practically cleared up there has not been much doing in this centre, but in Yorkshire and on the Continent, where the quantities of direct importations are heavy, raw wools and tops have been dealt in extensively at full rates. The demand from the United States of America still continues satisfactory, and with regard to their tariff it is now announced that there is to be no alteration in duties on greasy or scoured Colonial wools, but that there is some chance of carpet wools being allowed in on more favourable terms than hitherto.

Arrivals to date for the third series of sales, which commence here on 4th May, 1909, amount to 85,900 bales, of which 50,300 bales are from New Zealand, 31,300 from Australia, and the balance from South Africa.

Grain.—Wheat, etc.—The market has continued strong during the past fortnight, and prices have improved 1s. 6d. to 2s. per qr. in most positions. Shipments to Europe have continued below normal requirements, which is quite unusual at this period of the year, and in consequence stocks held in this country are gradually dwindling. The American markets have also shown strength, and the “bulls” have been able to maintain the high prices with only slight fluctuations. Buyers on this side are extremely reluctant to pay prices now ruling, particularly in view of the large quantity of wheat now nearly due, and at the close there was a pause in the demand, but the position generally seems a strong one for some time ahead.

English Wheat.—Supplies on the country markets are very restricted, and prices have advanced to 41s. to 42s. per 480lbs. delivered for good reds in some of the markets. The average price last week of 36s. 5d. per imperial qr. marks an advance of 8d. per qr. from the previous fortnight, and is 5s. 2d. per qr. higher than at the same time last year.

Australian Wheat.—Ex Store.—This continues to meet with a ready sale at increased prices. We quote:—43s. to 43s. 6d. per 496lbs.

New Zealand Wheat.—Shippers have shown more inclination to go on selling, and a fair number of parcels have changed hands. Up to 40s. 6d. per 480lbs. c.i.f. has been paid for Longberry, April-May shipment. *Ex Store.*—We quote nominally:—Shortberry, 39s. to 40s.; and Longberry, 41s. to 42s. per 496lbs.

Frozen Meats.—General Market.—Supplies of home-killed meat having been less heavy, and consequently higher in price, there is a welcome improvement in the demand for frozen lamb and, to a less extent, for mutton. Scotch mutton now realises 6¼d. @ 6¾d. per lb., and English 5½d. @ 6¼d. Best North American hinds are scarce and dear, but other chilled beef is still at a very moderate level of price. Danish beef, though in reduced supply, still sells at only 3½d. @ 4¼d. for cow sides, and 4d. @ 5¼d. for ox sides. States sides are quoted at 5¾d. @ 6½d., and Canadian sides at 5½d. @ 5¾d. States cattle realise £17 @ £24 per head, and Canadian £16 @ £20.

The improved demand for frozen meat (especially lambs), has arrested the downward course of prices and created a distinctly firmer feeling. The improvement is much overdue, and having regard to the heavy stocks in store and close at hand, it is hoped that the low prices current will cause even greater expansion in the trade than is usual at this time of year.

Importations of frozen meat and chilled beef show all round increases during the first quarter of 1909, as compared with the same period of 1908. The total increases amount to 444,262 carcasses mutton, 449,610 carcasses lamb, 23,499 quarters frozen beef, and 75,602 quarters River Plate chilled beef.

Lamb.—There is some improvement in the demand for lambs both at Smithfield and in the provinces, the market being helped by dearer home-killed mutton and by unusually mild weather for this time of the year. Delay in the discharge of steamers now in dock is responsible for a temporary shortage of Canterbury lambs, prices for which have consequently firmed up to 4¾d. @ 47½d. for under 36lbs., and 4½d. @ 45½d. for 36/42lbs., while 42/50lbs. carcasses realise 4½d. @ 4¼d. Australian lambs of best quality and small weight can only be sold with difficulty at 37½d.; good quality being obtainable at 35½d. @ 3¾d., and the lower qualities at 3½d. per lb.

Rainfall for the month of April, 1909, recorded at telegraphic stations in Western Australia, and averages.

STATIONS.	*Total for April, 1909, in points.	No. of wet days.	Average for April, 1908.	No. of Years Records.	STATIONS.	*Total for April, 1909, in points.	No. of wet days.	Average for April, 1908.	No. of Years Records.
TROPICS :					NORTH COOLGARDIE				
Wyndham ...	78	8	89	22	FIELDS :				
Turkey Creek ...	450	7	85	11	Sandstone ...	141	4	...	...
Hall's Creek ...	86	5	89	18	Wiluna ...	174	6	268	10
Fitzroy Crossing ...	158	3	71	15	Mt. Sir Samuel ...	193	6	51	8
Derby ...	634	7	139	23	Lawlers ...	203	7	111	12
Broome ...	521	6	132	19	Mt. Leonora ...	135	6	70	11
La Grange Bay ...	159	5	112	18	Mt. Malcolm ...	116	5	67	11
Wallal ...	171	2	130	12	Mt. Morgans ...	68	5	100	9
Condon ...	137	6	119	19	Laverton ...	113	5	123	9
Bamboo Creek ...	57	4	228	11	Murrin Murrin ...	86	4	70	10
Marble Bar ...	84	3	123	14	Yundamindera ...	73	2	34	8
Warrawoona ...	31	4	93	9	Kookynie ...	58	6	48	7
Nullagine ...	64	3	132	11	Niagara ...	41	2	47	12
Port Hedland ...	132	2	139	11	Menzies ...	127	3	72	12
Whim Creek ...	138	5	450	11	Mulline ...	54	4	78	7
Roebourne ...	430	6	191	22					
Cossack ...	538	6	191	27	COOLGARDIE GOLD-				
Fortescue ...	668	7	81	21	FIELDS :				
Onslow ...	939	9	74	23	Davyhurst ...	28	2	123	7
Winning Pool ...	490	5	52	11	Goongarrie ...	34	2	51	13
WEST COASTAL :					Broad Arrow ...	84	4	77	11
Carnarvon ...	16	1	59	26	Kurnalpi ...	127	3	55	12
Sharks Bay ...	2	1	18	15	Kanowna ...	31	5	53	13
Wooramel ...	10	3	55	10	Bulong ...	83	4	54	12
Hamelin Pool ...	13	1	28	23	Kalgoorlie ...	72	4	66	13
Northampton ...	70	4	69	27	Coolgardie ...	59	4	69	16
Mullewa ...	241	3	41	13	Burbanks ...	77	2	94	10
Geraldton ...	6	2	96	31	Widgemooltha ...	200	6	93	11
Greenough ...	7	3	90	27	Norseman ...	105	5	92	12
Dongarra ...	20	3	90	25	Boorabbin ...	172	5	44	14
Minginew ...	140	4	56	13	Southern Cross ...	254	7	50	19
Carnamah ...	116	5	70	21					
Dandarragan ...	366	7	81	11	S.W. COASTAL :				
Moora ...	143	5	56	11	Gingin ...	191	7	91	20
Walebing ...	100	8	68	25	Kalamunda ...	218	5	...	...
New Norcia ...	174	7	69	26	Guildford ...	134	6	148	29
MURCHISON FIELDS :					Perth Gardens ...	132	7	167	33
Peak Hill ...	223	6	140	11	„ Observatory ...	152	6	135	12
Abbotts ...	363	5	176	10	Fremantle ...	217	9	140	31
Gabanintha ...	306	3	126	9	Rottneest ...	137	5	130	27
Nannine ...	296	5	75	14	Rockingham ...	381	6	99	11
Cue ...	180	5	92	14	Jarrahdale ...	326	7	211	26
Day Dawn ...	213	4	82	13	Mandurah ...	661	7	130	10
Lake Austin ...	305	3	83	11	Pinjarrah ...	693	7	185	30
Lennonville ...	216	3	36	8	Collie ...	273	9	189	9
Mt. Magnet ...	185	3	50	14	Brunswick Junct. ...	239	8	...	...
Yalgoo ...	130	3	47	12	Bunbury ...	149	6	182	22
Murgoo ...	117	3	40	20					

*100 points=1in.

RAINFALL—continued.

STATIONS.	*Total for April, 1909, in points.	No. of wet days.	Average for April, 1908.	No. of Years Records.	STATIONS.	*Total for April, 1909, in points.	No. of wet days.	Average for April, 1908.	No. of Years Records.
S.W. COASTAL—continued.					S.W. INLAND—continued.				
Donnybrook ...	143	10	137	8	Arthur ...	136	8	91	18
Busselton ...	195	10	129	28	Wagin ...	190	8	100	18
Cape Naturaliste	177	11	116	5	Katanning ...	138	10	82	17
Karridale ...	246	13	222	15	Broomehill ...	174	12	22	18
Cape Leeuwin ...	194	13	184	12	Kojonup... ..	223	6	122	24
					Greenbushes ...	238	11	190	16
S.W. INLAND:					Bridgetown ...	165	10	148	21
Kellerberrin ...	389	8	56	16					
Meckering ...	228	8	74	11	SOUTH COASTAL:				
Newcastle ...	176	5	82	22	Mt. Barker ...	365	18	173	22
Northam ...	176	9	74	28	Albany ...	315	21	253	32
York ...	143	7	82	32	Breaksea ...	383	21	175	19
Beverley ...	268	6	66	26	Bremer Bay ...	352	10	180	24
Brookton ...	79	4	...	...	Hopetoun ...	378	10	159	7
Wandering ...	120	7	110	20	Ravensthorpe ...	449	12	122	7
Pingelly ...	174	5	84	18	Esperance ...	487	15	145	25
Narrogin ...	158	8	94	17	Israelite Bay ...	184	12	111	24
Marradong ...	313	6	103	11	Balladonia ...	105	8	75	18
Williams ...	171	8	120	24	Eyre ...	178	9	81	24

*100 points=1in.

REMARKS ON THE RAINFALL FOR APRIL, 1909.

A general excess above the average is shown throughout the Kimberley district, Wyndham and Hall's Creek being the only two stations to show a slight deficit; the greatest excess is in coastal districts between Derby and Broome.

In the North-West Division a large excess is noted in coastal areas between Roebourne and Winning Pool, but elsewhere throughout the division a decrease is shown, Whim and Bamboo Creeks being the only stations to show a large deficit. In the west coastal areas between Carnarvon and Hamelin Pool a slight deficit is noted, but throughout the Murchison and Coolgardie Fields, excluding a narrow strip of country embracing Burbanks on the south and Mt. Malcolm to the north and including Davyhurst, Muline, and Goongarrie, an increase is shown, more particularly over the Murchison Fields. In the South-West and South a large excess, in a majority of cases, is shown; the only portion showing a deficit are the districts surrounding Bunbury, and between Perth and Guildford and on the north coast from Dongarra to Geraldton and inland to Greenough. An excess of over five inches is noted at Mandurah and Pinjarrah, while many places show an increase from two to three inches.

General rain fell throughout the Kimberley district on the 2nd, but excepting Derby and Fitzroy Crossing, which recorded 340 and 140 points respectively, the falls were only light, from the 3rd to the 18th only light isolated showers fell. Between the 19th and 27th no rain fell in the East Kimberley division, but on the 28th 194 points were registered at Turkey

Creek, while in the West Kimberley 345 points fell at Broome on the 24th and 25th, and 258 points at Derby on the 25th and 26th.

In the North-West division light showers were noted on the 2nd, while on the 4th, 5th, and 6th the coastal portions between Port Hedland and Winning Pool were visited with heavy rains, Roebourne and Cossack respectively recording 318 and 352 points on the 4th and 5th, and Fortescue and Onslow 523 and 625 points for the three days. Between the 5th and 20th, with the exception of light showers at Onslow, no rain fell. Light scattered showers were registered on the 21st and general rain was recorded on the 22nd and 23rd, the country between Fortescue and Winning Pool receiving the heaviest falls. Further showers were recorded at the last-mentioned station on the 24th, but since then no further rain has fallen. Showery weather was experienced over the Murchison Fields on the 1st and 2nd and moderate to heavy falls were noted on the 6th and 7th, Lake Austin registering 184 points on the 5th and Abbots and Meekatharra 265 and 196 points respectively on the 6th; from thence onwards, excepting scattered showers on the 23rd, dry conditions have prevailed. The northern portion of the Coolgardie Fields was visited with moderate showers on the 1st and 4th, whilst on the 7th and 8th general rain fell throughout the whole division, the heaviest fall being noted between Boorabbin and Southern Cross.

Light isolated showers fell on the 11th and 12th and again on the 24th to 26th. In the S.W. and S. showery conditions were experienced during the first week of the month, while heavy general rain fell between the 9th and 12th, in many places being the heaviest on record for April. The falls were particularly heavy in coastal districts between Rockingham and Mandurah and inland to Pinjarrah and Marradong as well as at Kellerberrin. Since the 14th only scattered showers have fallen in the S.W. division and principally confined to the S.W. corner, but in the S. coastal areas unsettled, showery weather has been of daily occurrence, some heavy falls being noted on the 24th and 25th.

EDITORIAL REQUEST.

Correspondence and Queries are invited from subscribers and readers of the Journal on any subject of interest to agriculturists and other settlers on the land, either conveying useful information or seeking it. Suitable letters and contributions will be published and answers to queries given in the succeeding issue, if communications are received by the Editor not later than the fifteenth of each month.

Secretaries of Agricultural Associations, Societies, and Farmers' Clubs are kindly requested to supply corrections of the lists published in the Journal, such as changes of appointments, dates of shows and meetings, as well as any other items of interest.

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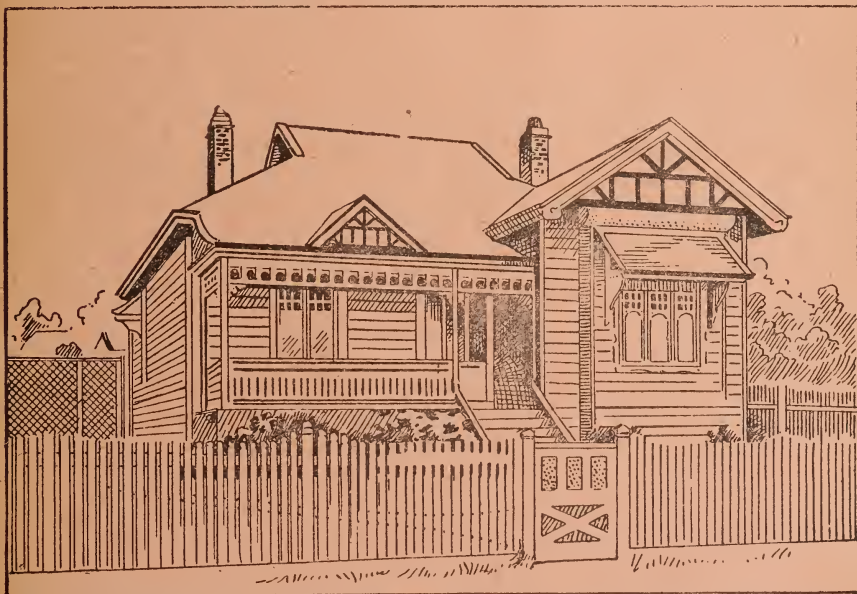
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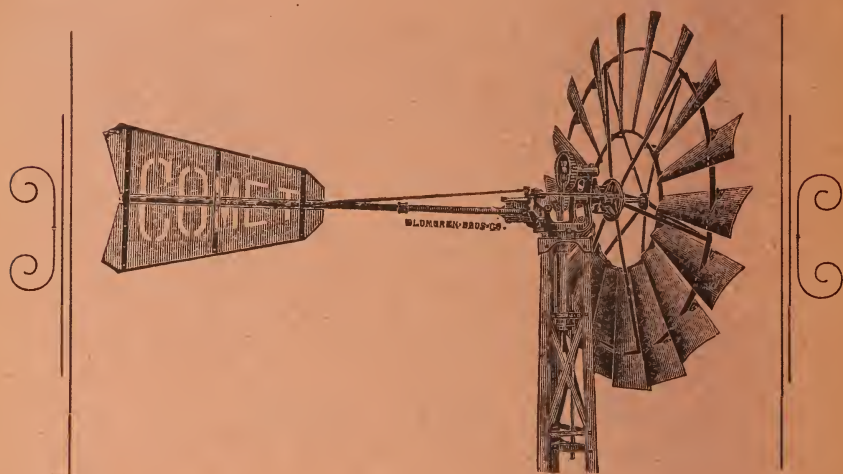
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Beverley Agricultural Society	G. Townley, Beverley
Bridgetown Agricultural Society	T. Rossiter
Bunbury Agricultural Society	W. S. Hales
Busselton Agricultural Society	A. R. Bovell
Cannington Agricultural and Horticultural Society	W. E. Cockram, Canning
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Geraldton Agricultural Society	W. Cassel Brown, Geraldton
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Jandakot Agricultural Society	F. W. Martin, Post Office, Janda- kot
Jarrahdale and Serpentine Agricultural Society	W. J. Watson, Mundijong
Katanning Agricultural Society	W. W. Bruntton
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King River Settlers' Association	E. H. Playne, Albany
Kojonup Agricultural Society	A. J. McGrath, Kojonup
Lower Blackwood Farmers' and Graziers' Association	P. D. E. de Nève, Lower Black- wood
Moora Agricultural Society	P. W. Glacken
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Narrogin-Williams Agricultural Society	G. G. Lavater, Narrogin
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Northam Agricultural Society	V. H. Spencer, Northam
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Royal Agricultural Society of W.A.	Theo. R. Lowe, Perth
Southern Districts Agricultural Society	Percy Smith Bignell, Busselton
South-West Central Agricultural and Horticultural Society	F. H. Layton, Donnybrook
Swan Agricultural and Horticultural Society	H. A. Levenish, Guildford
Toodyay Agricultural Society	A. James, Newcastle
Wagin-Arthur Districts Agricultural, Horticultural, and Industrial Society	W. E. Clarke, Wagin
Wellington Agricultural and Pastoral Association	W. S. Hales, Bunbury
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Albany and King River Settlers' Association	R. H. Playne, King River
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Balingup Farmers' Association	P. V. Manger, Balingup
Bedfordale Agricultural and Horticultural Society	T. W. Ottaway, Bedfordale,
Boyanup Farmers' and Progress Association	W. Eccleston, Boyanup
Boyp Brook Agricultural and Vigilance Committee	Wm. Vincent, Boyp Brook
Brunswick Farmers' Association	Arthur E. Clifton, Brunswick
Bullsbrook Progress Association	D. Strachan, Bullsbrook.
Capel Farmers' Association	C. J. Rooney, Capel.
Central Fruitgrowers' Association	A. Barratt, Perth
Coogee-Spearwood Agricultural and Horticultural Society	R. Barton, Hamilton-road, Spear- wood
Cookernup Farmers' Progress Association	A. L. Cunnold, Cookernup
Dangin-South Caroling Progress Association	W. G. Haines, Caroling, East Beverley.
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Denmark Settlers' Association	H. V. Buckley, Denmark
Drakesbrook Agricultural Association	H. McNeill, Drakesbrook
Esperance Agricultural, Horticultural, and Floricultural Society	R. H. Dean, Esperance
Fremantle Horticultural Society	Hugh C. Anderson, Hon. Sec., c/o Union Stores, Ltd., Fremantle
Goldfields Dog, Poultry, and Horticultural Society	J. A. McNeill, Coolgardie
Goldfields Agricultural Society	Monmouth Smith, Kalgoorlie
Goomalling Farmers' Association	W. Gray, Goomalling, via Northam
Greenhills Farmers' Club	James McManus, Irishtown
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Harvey Citrus Society	Kenneth Gibson, Harvey
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Jurakine Agricultural Society	W. Hayward, Jurakine
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Moonyoonooka Farmers' Association	W. H. Williams, Moonyoonooka
Murray Horticultural Society	Miss M. Alderson, Pinjarra
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Newtown Progress Association	T. A. Thurtle, Woodlands, Vasse
North Greenough Farmers' Association	W. F. Stansfield, Bootenale
North Lake Progress Association	A. E. F. Johnston, c/o W. Lyons, South Road, Fremantle
Parkerville Agricultural Society	S. Ramsay, Parkerville
Plantagenet Beekeepers' Association	Vacant.
Popanyinning Progressive League	F. R. Bayliss, Popanyinning Pool, G.S. Railway
Preston Progress Association	T. B. Jones, Preston
Quindalup Progress Association	W. E. Carter, Busselton
Spearwood Progressive Association	R. Barton, Hamilton-road, Spearwood, Fremantle
Talbot Progress Association	O. Ryan, York.
Thomson's Brook Progress Association	J. W. Padman, Thomson's Brook.
Toodyay Vine and Fruitgrowers' Association	W. A. Demasson, Newcastle.
Tenterden Agricultural Society	J. Lunt, Tenterden
Upper Chapman Farmers' and Fruitgrowers' Association	D. O'C. Kehoe, Narra Tarra
Victoria Plains Farmers' Association	J. Halligan, Summer Hill, Victoria Plains
Waigerup Agricultural Hall Association	W. J. Eastcott, Waigerup
Wandering District Agricultural Society	W. B. Smithson, Wandering
Wanneroo Farmers' and Gardeners' Association	F. J. Hollins, Wanneroo
Waterloo Farmers' Vine and Fruitgrowers' Association	T. W. Harris, Waterloo
West Swan Producers' Association	J. H. Stone, Guildford
Wongamine Farmers' Club	G. W. B. Smith, Wongamine
Wonnerup Progress Association	P. S. Brockman, "Reinscourt," Busselton
Woorlooloo Progress League	T. H. Ilbery, Woorlooloo
W.A. Beekeepers' Association	W. Potter, Goldsworthy Road, Claremont
Wagin Beekeepers, Poultry Fanciers, and Fruitgrowers' Association	F. A. Pfeiffer, Wagin.
West Albany Settlers' Association	Alfred Burvill, Grasmere, via Albany
West Coolup Progress Association	Stanley Caris, Pinjarra
West Pingelly Progress Association	J. J. Parker, Neta Vale, Pingelly.

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Bunbury	E. Krachler, Bunbury
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Collie	A. E. Smith, Collie
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Gingin	Chas. W. Johnson, Gingin
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West Australian Minorca Club	E. J. Ford, Rockton Road, Claremont.

DATES OF MEETING OF SOCIETIES.

- Albany and District Settlers' Association—
At Torbay Junction.
- Armada Progress Association—
Last Tuesday in each month, at 8 p.m.
- Boyanup Farmers' and Progress Association—
First Saturday in each month.
- Brunswick Farmers' Association—
Wednesday preceding full moon, at 8 p.m., at the Agricultural Hall.
- Capel Farmers' Association—
Last Saturday on or before the full moon, at 8 o'clock.
- Greenough Farmers' Club—
January, April, July (annual), and October.
- Jarradale and Serpentine Agricultural Society—
Meet the Saturday preceding the full moon, at 8 o'clock p.m., at the Agricultural Hall, Mundijong.
- ROYAL AGRICULTURAL SOCIETY OF W.A.—
Second Tuesday in each month.
- Upper Chapman Farmers' and Fruitgrowers' Association—
Last Saturday in the months of December, February, April, July, August.
- W.A. Beekeepers' Association—
Second Wednesday in each month, Museum, Department of Agriculture, 7.30 p.m.
- Wanneroo Farmers' and Gardeners' Association—
Saturday on or before full moon, at Wanneroo State School.
- West Coolup Farmers' Association—
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- (a.) Holdings in fee simple; or
- (b.) Holdings under Special Occupation Lease or Conditional Purchase from the Crown; or
- (c.) Homestead Farms; or
- (d.) Such other real or leasehold property as the Trustees may think fit.

Advances may be made of an amount not exceeding £300 to the full value of the improvements proposed to be made.

Further advances may be made of an amount not exceeding £200 to one-half the value of the additional improvements proposed to be made.

No advance shall be made to discharge an existing mortgage to an amount exceeding three-fourths of the value of the improvements already made on the holding. The improvements recognised for this purpose are:—Ringbarking, clearing, fencing, draining, and water conservation. Advances are not made for "completion of purchase"; liabilities which have been incurred in the development of the security only being recognised.

At no time shall the advances to any one person (or number of persons if borrowing conjointly) exceed the sum of £500, and no sum exceeding £100 shall be advanced to any one person for the purchase of breeding stock. In applications for this purpose, the condition and capability of the security to successfully carry stock is of paramount importance.

Persons under 21 years of age, being unable to legally mortgage, are debarred from borrowing from the Bank.

Every application for an advance must be made on the Bank's forms, and shall contain all particulars required thereon.

Applications may be for sums of £25 or any multiple thereof, not exceeding £500. Each application must be accompanied by a valuation fee of 1 per cent. of the amount applied for. No refund of fee is allowed after an inspection of the security has been made.

Mortgages are prepared free of charge, but borrowers are required to pay the statutory charges in connection with their registration. These are:—

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- (b.) A registration fee of 5s. for each Conditional Purchase or Homestead Farm Block mortgaged.

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3. Land for Orchards, Vineyards, or Gardens, from 5 to 50 acres, from 20s. per acre, payable in three years. Improvements, including fence, to be completed in three years.

4. Full particulars as to conditions, areas, and further methods of obtaining land will be found in the pamphlet "Selector's Guide," obtainable on application to the undersigned.

5. Surveys are carried out by the State at half cost to selectors.

6. The Agricultural Bank renders monetary assistance to enable settlers to effect improvements when land has been substantially fenced.

7. On a selector proceeding to any district for the purpose of selecting land, the nearest Land Agent will supply all information, plans, and pamphlets, as well as a guide to conduct him to available land free of charge. In the event of an application for land being made, with the necessary deposit, a refund of railway fare may be obtained, if the deposit on land selected is equal to 50 per cent. more than the amount of the fare, and provided the application for refund is supported by a certificate from a Government Land Agent stating the place from which the selector proceeded for the purpose of selecting.

8. The Railway Department grants a special concession in the way of fares and freights for a new selector's family and goods, on production of a certificate of *bona fides* from the Lands Department. Any selector of an area of not less than 500 acres first-class land may obtain from the Lands Department an order for railway tickets and freight for his family, goods, and chattels, from the station nearest his present or late residence to the station nearest the land selected, the amount to be repaid to the Department by the selector by bills at 12 and 24 months, with 5 per cent. interest added; until the bills are paid the land cannot be transferred or mortgaged except to the Agricultural Bank.

9. Any new selector residing on his land can arrange passages for his wife and family to this State through the Colonial Secretary's Department.

10. Agencies are established at Menzies, Coolgardie, Kalgoorlie, Southern Cross, Cue, Northampton, Geraldton, York, Northam, Beverley, Newcastle, Bunbury, Katanning, Albany, Bridgetown, Busselton, Narrogin, Wagin, Pingelly.

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Perth, Western Australia.

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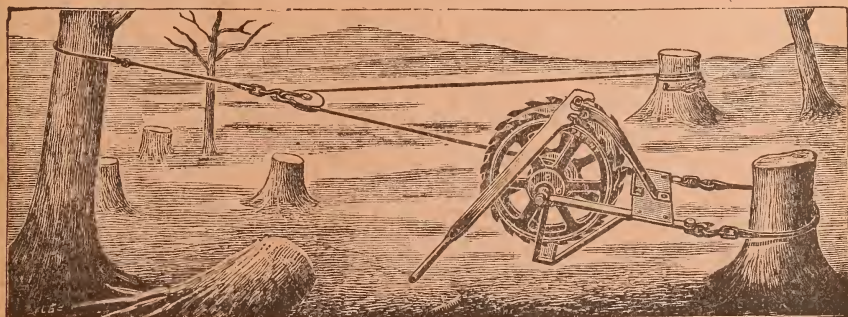
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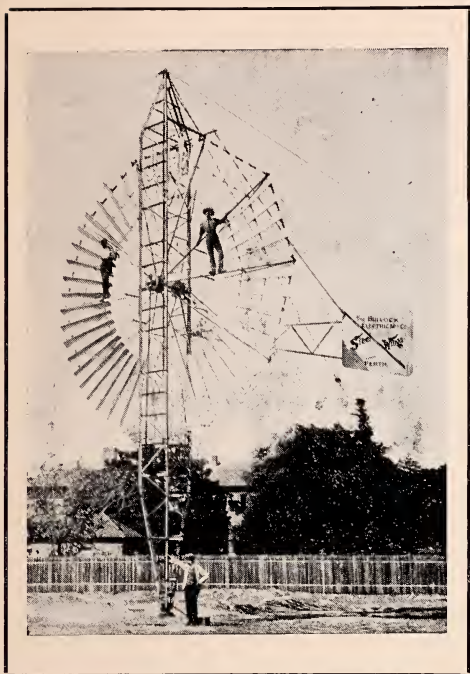
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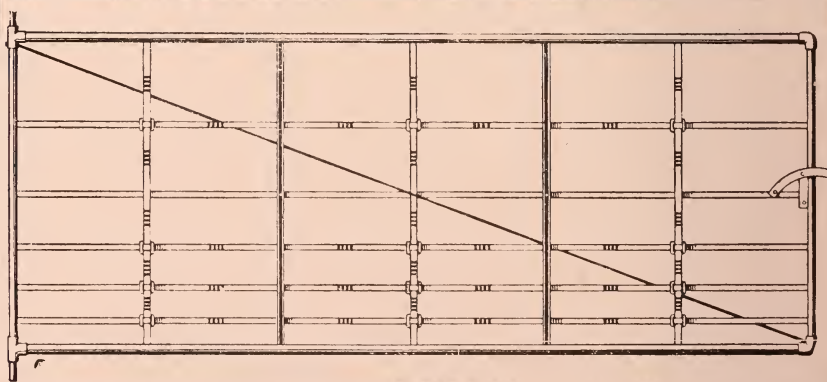
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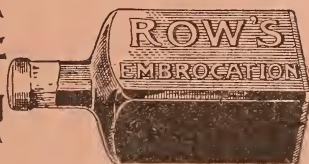
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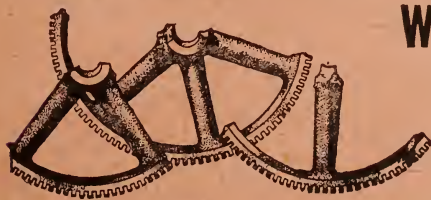
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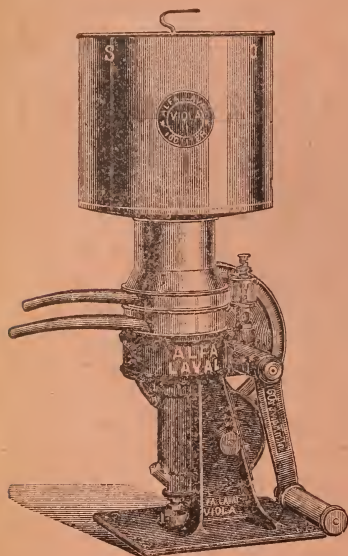
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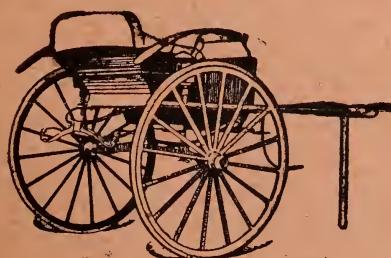
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Examination Results.

University Primary or Preliminary...	94	Passes
University Junior ...	114	"
University Senior ...	52	"
University Higher ...	40	"
University Honours ...	191	"
First Place in South and West Australia ...	9	Times
Second Place in South and West Australia ...	8	"
Third Place in South and West Australia ...	4	"

Money Prizes won by the Students.

19 University Prizes, amounting to ...	£	s.	d.
26 Government Exhibitions of £15 each ...	294	3	4
14 Government Exhibitions of £25 each ...	310	0	0
5 University Exhibitions of £450 each ...	2,250	0	0
1 University Exhibition of £225 ...	225	0	0
2 Rhodes Scholarships (£900 each) ...	1,800	0	0
	£5,229	3	4

NOTE SPECIALLY that boys of all Denominations are admitted to the College. The religious opinions of every Student are scrupulously respected.

In writing for Prospectus kindly mention this Journal.

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NEPTUNE UNRIVALLED PATENT STEEL FENCING WIRE

Is now the standard wire for fencing purposes. It has been used in this State for many years past, and each year sees an ever-increasing number of satisfied users. The strongest advocates for it are those who have tested it alongside other brands of steel wires. The 12½-g. and 14-g. will save you over 50 per cent. as against Nos. 8 and 10-gauge ordinary wire, and show a difference of over 250 per cent. on transport charges. No sagging in summer or snapping in winter. Call and see the wire tested, or write for booklet on fencing costs. We specialise in fencing materials.

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"NEPTUNE UNRIVALLED" 12½-g. ...	1,140lb.	1,430yd.	£19	23/5 26/3
ORDINARY GALVANISED 8-g. ...	1,125lb.	*528yd.	£10	33/4 40/10
"NEPTUNE UNRIVALLED" 14-g. ...	730lb.	2,240yd.	£20	15/4 17/1
ORDINARY GALVANISED 10-g. ...	720lb.	*816yd.	£10 10 -	22 8 27/9

Two of the many testimonials we receive:—

Mr. James Guthrie, "Glengyre," Newlands, writes:—"Your 'Neptune Unrivalled' is the best wire I have ever used. It has stood trees from a bush fire burning on it."

At the same time Mr. Guthrie sends us a second order for this wire, and states that he will require a further quantity a little later.

Mr. J. G. Johnson, Darkan: "Recently a tree fell across my fence (12½-gauge Neptune Unrivalled Wire), taking all the wires right to the ground, the top wire splitting the two posts in 12ft. panel. I cut the tree away, and the wires sprang back to original position, humming like fiddle strings, and I have not found it necessary to re-strain the wires. They are as taut now as when erected three years ago."

Although we have repeatedly warned squatters and farmers to

BWARE OF HAVING IMITATIONS

of Neptune Unrivalled Wire sold to them as being "just as good as Neptune," we are still receiving letters from sorry men who have disregarded our warning.

THEY HAVE BEEN ONCE BITTEN, BUT NEVER AGAIN.

Once more we warn those about to fence—Beware of imitations of Neptune Unrivalled.

Don't be put off by talk and unsubstantiated figures.

NEPTUNE UNRIVALLED is the only wire that has a **GUARANTEED** breaking strain and a **GUARANTEED** length per cwt. It has stood the test of time. Frosts do not affect it.

Send for our Booklet showing copies of letters from men who have used Neptune Unrivalled Wire.

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Mr. G. S. THOMPSON, Government Dairy Instructor made experiments in the hand-feeding of cows for milk and butter production, and in his report states that the yield of milk was greater from rations containing Sunlight Oil Cake than from rations in which Sunlight Oil Cake was not used. Mr. Thompson also proves that there is a decided fall in the quality of the milk from rations without Sunlight Oil Cake. Note the name "Sunlight" is branded on every cake.



JOURNAL

OF THE

DEPARTMENT OF AGRICULTURE

OF

WESTERN AUSTRALIA.

By Direction of

The HON. THE MINISTER OF AGRICULTURE.

PUBLISHED MONTHLY.

Vol. XVIII.—Part 6.

JUNE, 1909.

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—
1909.



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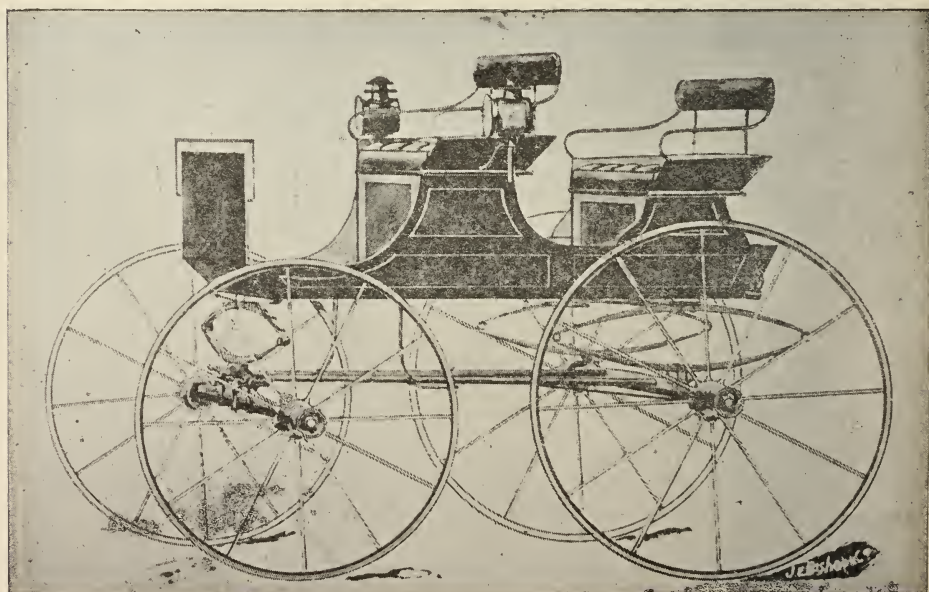
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JOURNAL
OF THE
Department of Agriculture
OF
WESTERN AUSTRALIA.

Vol. XVIII.

JUNE, 1909.

Part 6.

NOTES.

— — —

Experiments under Co-operation.—The number of Canadian farmers who now co-operate in carrying out experiments designed on a uniform basis by the Agricultural Department is 45,565, and it is said that the value of such combined investigations has been thoroughly demonstrated. Special samples of different kinds of seed were distributed for trial to 42,074 applicants.

— — —

Mr. George Compere.—The State Entomologist, Mr. George Compere, is now proceeding to Hong Kong, which will be his headquarters whilst he is engaged in searching China for parasites. He will endeavour to find the parasite of the tomato moth, parasites of sheep and cattle tick, and also of the obnoxious blow-fly, the latter of which is known to be in existence in China.

— — —

Fruit-fly Pupa for Italy.—The Department sent a package of parasitised fruit-fly pupa by the s.s. "Seydlitz" on May 25, to Professor F. Silvester, of the Royal School of Agriculture at Portici, in Italy, where it will be utilised for breeding the parasites. The acting Italian Consul, Mr. L. Ratazzi, took charge of the parcel for shipment, and deposited it in the steamer's cool chamber.

— — —

Sunflower as a Product.—There is much value in the sunflower. Besides affording good feed for fowls, the decorticated seed contains about 50 per cent. of oil and makes an oil-cake most nutritious for all kinds of stock. Seed-cake possesses the following components:—Fat, 10 per cent.; albuminoids, 20 per cent.; carbohydrates, 32 per cent.; fibre, 20 per cent.; ash, 6 per cent.

Parasitised Fruit-fly for Honolulu.—By Mr. George Compere, the State Entomologist, who left on 25th May for the Orient, *via* Sydney, the Department forwarded a consignment of parasitised pupa of the fruit-fly (*Ceratitis capitata*), to be entrusted to the officers of the s.s. "Aorangi" which sailed for Honolulu on June 7. This parcel was forwarded to the Board of Commissioners and Forestry for liberation of the parasites in the islands if they are successfully bred from the pupa.

New Zealand's Meat Export.—In 1882 New Zealand sent her first export of frozen meat to England, amounting to the modest total of about 750 tons. Since that date the trade with the United Kingdom has reached astonishing dimensions. It is estimated that the Dominion will ship to the old country this season no less a total than 5,500,000 sheep and lambs, besides thousands of tons of beef.

Huge Wheat Shipment.—The Farmers' Co-operative Union of South Australia shipped by the White Star liner "Cufie," on May 21, for Liverpool, the largest cargo of wheat ever placed in one bottom at Port Adelaide. In all 4,200 tons, equal to 45,000 bags, were put under hatches, nearly all being placed on board direct from railway trucks or wharf sheds where it had been previously stowed. One day's loading alone consisted of 11,457 bags, which was a record day's work.

Castor Oil Plant as Green Manure.—From analysis made of the castor oil plant, the total weight of crop per acre (1,210 plants) was found to be 6,655lbs., containing 2,323lbs. of organic matter (34.91 per cent.) of humus-forming material. The nitrogen added to the soil by a crop of castor would thus be 33.3lbs. per acre, while at the same time it furnishes 21.3lbs. phosphoric acid (anhydrous) and 53.2lbs. potash.—*Ceylon Agricultural Society.*

Further Discovery of Phosphates.—Messrs. C. Goczal, Geologist, and P. J. Gibbons, Stock Inspector, have made a recent tour of exploration of the South-West coastal districts as far as Black Point, near the Donnelly River. They report having discovered two large caves in the latter locality containing phosphatic deposits in sufficient quantity to meet the requirements of agriculturists in the neighbourhood. Further prospecting will be undertaken at an early date when the state of the weather is more favourable for rough travelling.

Remedy for "Die-Back."—The *Tropical Agriculturist* gives the following remedy for fruit trees afflicted with "die-back," a common disease due to starvation through want of proper drainage and manure. The treatment consists of thorough drainage and liming (2lbs. to 6lbs. lime per tree), followed later by a good dressing of manure—if artificial, say ½lb. sulphate of potash, ½lb. saltpetre, and 1lb. sulphate of lime per tree; old trees might get more. Prune off all diseased parts and paint cuts with tar, leaving only healthy tissue to grow.

The Tobacco Industry in Victoria.—Since the 1901-2 season the tobacco industry in Victoria has made steady progress. The number of growers in the period named was seventeen, the land under cultivation 103 acres, and

the product of dry leaf was 345ewt. Increasing each year, the returns for 1907-8 were 49 growers, 345 acres under cultivation, and a yield of 1,767ewt. A good quality cigar leaf is produced which sells at 1s. to 1s. 6d. per lb., whilst pipe tobacco, also the product of the State, sells at 7d. to 9d. per lb. Crops of 1,000lbs. to 1,500lbs. of cured leaf per acre are obtained, equal to £30 to £40 for pipe tobacco and as high as £100 per acre for cigar leaf.

Development of the North-West.—The Government are taking action in the direction of developing the North-West portions of the State by despatching Mr. A. Despeissis, Under Secretary of the Department, to the North for that purpose. Mr. T. S. McNulty, secretary of the Goldfields Water Supply Administration, has been appointed to carry out the duties of Under Secretary for Agriculture during the absence in the North of Mr. Despeissis, who will carry out the initial work of the scheme, particularly in regard to tropical agriculture.

Western Australian Fruit in London.—Messrs. Keeling & Hunt, auctioneers in London, sold on 5th May, at Monument Buildings, 25 cases of Western Australian grapes, *ex* "Orontes," at prices ranging from 11s. to 21s. per case. At the same time they sold 135 cases of Winkfield pears from this State, the prices realised being 3s. 6d., 10s. 6d., and 11s. per case. The grapes, which were shipped by Mr. Barrett-Lennard, comprised Flame Tokay, Santa Paula, Cornichon, Almeira, and Gros Colman, packed in 25lb. cases. A later consignment of Mr. Barrett-Lennard's fruit, *ex s.s.* "Malwa," was sold by Messrs. Keeling and Hunt on 12th May, and realised the following satisfactory prices:—Five boxes Flame Tokay, 11s. each; four of Santa Paula, 7s. 6d. each; one Red Prince, 7s. 3d.; six Almeira, 24s. each; and nine of Purple Cornichon, 22s. each. One hundred and forty-nine cases of pears sold at 10s.

Value of Tree-planting.—The waste and neglected corners of the farm should be turned into timber plantations where the farmer may grow his own posts, poles, fences and firewood. It is worth while to keep all the farm at profitable use. The owner pays taxes on all his lands and is out of pocket for whatever is not earning him something. Further, by growing a tree crop on land that is too poor to plough, the quality of the land itself is improved. Forests add humus to the soil, bettering its character; and there is no land so poor that some tree cannot be found to thrive there. Even if this timber has no other use it may break the force of the wind and provide shelter for stock.

Cotton Cultivation.—The world's demand for cotton increases steadily, but the supply does not show signs of responding to the demand by a proportionate increase. Egypt and America, the two great sources of better-class cottons, are apparently already producing almost up to their full capacity for this kind of crop. Now, if ever, is the time to extend the cultivation of cotton into new territories and to improve the yield and value of the fibre where it is already being grown. More than one-fifth of the population of Great Britain are more or less directly connected with the cotton trade; therefore, apart from those of gain there is reason of Imperial importance for encouraging the growth of the industry within the British Empire. It should be borne in mind that the Commonwealth offers a bonus, equivalent to ten per cent. on the market value, for cotton grown by white labour in Australia.

FRANCO-BRITISH EXHIBITION.

WESTERN AUSTRALIAN COURT.

REPORT AND BALANCE SHEET.

PART I.

The Hon. Minister for Agriculture.

The accompanying report from Mr. Wicken, the Secretary of the Franco-British Exhibition Board, was considered by the Board to-day, and it was unanimously resolved that I should forward it on for your information. The figures given in the Balance Sheet will probably need some slight revision when the accounts are finally closed, but they are practically correct.

This is probably the conclusion of the Board's business, and opportunity is taken to put on record the Board's appreciation of the very efficient manner in which Mr. Wicken has carried out his duties, and which has contributed in so great a degree to the success which has attended the W.A. exhibit.

R. CECIL CLIFTON,

28th April, 1909.

Chairman.

REPORT.

The Chairman Franco-British Exhibition Board.

Sir,—I am forwarding herewith a report on the operations of the Board and the work relating to the Western Australian Court at the Exhibition, together with a balance sheet of the expenditure in connection therewith. The net expenditure amounts to £7,863 1s. 1d.

It will be necessary to have one more meeting of the Board for a few minutes to pass the final accounts, etc., which could be held one day next week.

This will complete the work of the Board, and I am now engaged on my Departmental duties.

Yours etc.,

PERCY G. WICKEN,

16th April, 1909.

Secretary.

Perth, 30th March, 1909.

To the Chairman Franco-British Exhibition Board, Perth, W.A.

Sir,—In connection with the representation of this State at the Franco-British Exhibition, I beg to report as follows:—

On the 12th June, 1907, Cabinet approved of a Board being formed, consisting of Messrs. Clifton, King, Richardson, and Wicken, to secure active representation of the State at the Franco-British Exhibition, 1908, and on the 19th July authority was given for the expenditure of £16,000 for this purpose.



General View of Australian Building.

The first meeting of the Board was held on the 21st June, at which Mr. R. C. Clifton was elected Chairman, and meetings were thereafter held at regular intervals as required, the total number held being 25. At a later date Mr. B. Maughan, Secretary to the Kalgoorlie Chamber of Mines, was added to the Board. On the 6th November it was decided by Cabinet that Mr. Wicken be sent to London to take charge of the West Australian Court, and from that date to devote the whole of his time to the collection of an exhibit.

I accordingly arranged to leave Perth by the R.M.S. "Macedonia" on February 10th, 1908, and it was decided that the bulk of the exhibits were to be shipped by the same boat. The total shipment amounted to 333 cases, but, unfortunately, owing to the steamer being in a hurry to get away, half of these were left on the wharf and had to follow by a later boat. I arrived in London on Saturday, March 14th, and on Monday, the 16th, started to make the necessary arrangements for fitting up the West Australian Court. In the meanwhile Mr. C. H. Rason, Agent General, had been appointed Resident Commissioner in London, and two honorary Commissioners, Messrs. Charles Harper and W. T. Loton, were also appointed. Mr. Gibb Maitland had also been appointed to take charge of the mineral section of the exhibit, and he arrived a fortnight after I did.

On my arrival I found the building in the Exhibition grounds in a very backward state, and it was not until April 29th that the roof was completed over the Court. In the meantime we had made as much progress as possible with the fittings, and immediately the roof was completed we commenced to unpack the exhibits, and by working long hours had everything in order and ready for the opening day, May 18th, being the only Court in the Exhibition which was ready for the occasion; and visitors who, after the opening ceremony found their way through the grounds, were conducted to the Western Australian Court, where everything was in order and an attendant in uniform at the door. This secured a good reputation for Western Australia and was very favourably commented on in commercial circles in London. At the Western Australian dinner held in London this year, Sir Gerard Smith, one time Governor of Western Australia, said that years ago when he resided here he understood that the letters "W.A." always signified "wait awhile," but that since he had been to the Western Australian Court on the opening day he thought they now meant "Well ahead."

No other Court in the Australian building was open until a fortnight after this, but we blocked our Court off from the other part of the building and admitted visitors through the nearest door to our side. During the whole of the Exhibition, from the opening date until day of closing, the Western Australian Court was accessible to the public.

The King's Visit.

The other Courts were mostly completed by the date of the visit of His Majesty the King on May 26th. On that occasion the Australian building was entirely closed to the public until 6 p.m. His Majesty, accompanied by Her Majesty the Queen and Royal suite, spent the full time allotted to them in the Australian Court, and a large proportion of this time was spent in our section of the building. Great efforts had been made to have everything in readiness, and at the hour appointed for His Majesty's visit, 4.30 p.m., all was in as good order as it was possible to get it.

His Majesty and suite entered the Australian building by the main entrance hall, which was arranged as a tropical house, with large palms, ferns, and flowers of all descriptions. Turning to the right, the Royal party passed into the Victorian Court, where two or three minutes were spent; they then walked through the Tasmanian Court and into the Western Australian Court, where they were received by the Resident Commissioner (Mr. C. H. Rason), Messrs. Charles Harper and W. T. Loton (Honorary Commissioners), Mr. Percy G. Wicken (Officer in charge), and Mr. Gibb Maitland. His Majesty devoted more time to this Court than any other, and much admired the jarrah fittings, nuggets of gold, and pearl shell service which were displayed for his inspection. His Majesty was most graciously pleased to accept a handsome inkstand made of Western Australian timbers and metals, which was presented to him by the Resident Commissioner of the Court. After receiving this trophy His Majesty expressed the wish that it might remain in the Court until the close of the Exhibition, after which it was forwarded to Buckingham Palace.

Arrangements had been made to have the diver at work in the large tank in the Western Australian Court, and their Majesties were much interested in the exhibition. The diver could be seen to advantage in the water, and visibly wrote on a slate the words, "God Save the King," and in French, "Vive la France et son ami le President." He also spoke through a telephone from under the water. Their Majesties then continued on through the Queensland, New South Wales, and South Australian Courts. The scheduled time for the Royal visit to the Australian Courts was ten minutes, but this was somewhat exceeded. No one except State representatives were allowed in the Courts at the time, and all employees had to leave the building by 1 p.m., consequently their Majesties had a splendid opportunity of inspecting the exhibits. The Queen and other members of the Royal family paid several subsequent visits to the Exhibition. The Exhibition as a whole was so large that for the whole of the three hours or so which His Majesty and suite spent there they were continuously moving.

The Buildings and Grounds.

The Exhibition buildings covered an area of about 140 acres. There were approximately 400 buildings within the ground, including 20 palaces and many miles of roads and canals. The grounds were planted with ornamental trees and laid out as gardens, and the effect was most pleasing. The buildings were all painted white, hence it became known as "The White City."

The principal feature among the buildings was the Court of Honour. Here the visitor stood by a lake spanned by artistic bridges, beneath which gondolas and electric launches glided along the mile and a half of canals, which gave the Exhibition a Venetian aspect. On each side of the lake were buildings, mostly oriental in design, and at the northern end was a Congress Hall, where important functions and meetings were held. At the base of this building a cascade plunged down into the lake. The crystal stairway beneath the cascade was illuminated by moving electric lights, which gave the water the appearance of a stream of liquid fire of various colours. At night electricity converted these palaces into a veritable blaze of light, and from the top of the buildings down to the water's edge the place was like fairyland. Other buildings were the Palace of Music, French Applied Arts, British Applied Arts, Palace of Women's Work, Picture Gallery, Palace of Decorative Arts,



Western Australian Court Mineral Section.



and the Machinery Hall. The largest building in the Exhibition was the Machinery Hall, which covered eight acres of ground, was equally divided between the British and French exhibitors, and contained specimens of every branch of engineering skill. To the north of the Court of Honour were the Elite Gardens, fragrant with the perfume of hundreds of roses and other flowers. Here was a sunken band-stand with terrace of steps, where the Grenadier Guards' and other bands played during the season. The Garden Club, a splendid building with a facade of glass, was the social rendezvous during the Exhibition. It contained a large dining-hall and luxurious rooms for the convenience of members, both ladies and gentlemen.

Other Attractions.

One of the great attractions was the Irish Village, which was some 10½ acres in extent and was called Ballymaelinton, where thatched cottages, old Irish monuments, and colleen bawns were to be met with as in the Emerald Isle. By way of contrast there were a Senegalese Village, peopled by natives from French West Africa, the Indian Palace, Ceylon Village, Algerian Mosque and many others.

Among the side shows there was a scenic railway, on which you went among snow-capped hills and through dark tunnels; the Flip Flap, the arms of which lifted you up about 100 feet in the air and deposited you on the other side; also the Stadium, which was perhaps one of the most wonderful structures in the grounds, where 100,000 people could find seating accommodation and watch the events on the cycling or running track, the swimming competitions, or the Marathon contests.

The Stadium, which is claimed to be the finest sports arena in the world, was so arranged that everyone was sure of a good view of the games. In the centre was a grass field, oval in shape, about 700ft. long and 300ft. wide. Encircling this was a running track of three laps to the mile, again surrounded by a cycling track three-eighths of a mile in circumference. Opposite the Grand Stand was a swimming-bath 109 yards long, with diving board 55ft. in height. In the Stadium at night were brilliant displays of fireworks.

Western Australian Court.

The space allotted to Western Australia was approximately 4,000ft., or an area of 85ft. x 50ft. This space was fitted all round with a jarrah platform and jarrah balustrading highly polished and offering a splendid advertisement for our timber. The walls were draped with green and gold, these colours contrasting well with the jarrah. On these platforms were shown most of our exhibits, while on the walls were hung photographs representing the agricultural and mineral resources of the State, paintings of our wild flowers, shields with statistics showing the immense increase that has taken place during the past ten years, and the Union Jack, French and Australian flags. In the centre of the Court was a large trophy 24ft. across and about 25ft. in height. It contained eight alcoves, in each of which was a trophy of our products. Over each of the alcoves was an arched dome dressed with pearl-shell, wheat, and wool alternately. The top of the trophy was in the shape of a dome which was dressed with wheat and pampas grass, surmounted by two opossums climbing a tree; hanging under this was a large crystal light, and the trophy itself was outlined with 200 electric lights, which when lighted

up in the evening gave it a very attractive appearance. There was not an inch of waste space in the whole of the Court, therefore as there was not sufficient room to spread out our exhibits, the above arrangement made the Court a very compact one.

One side of the Court consisted of exhibits of timber, wheel naves, felloes, spokes, etc., as well as a fine collection of wool and wheat. On the opposite side was displayed a collection of jarrah furniture, designed and carved by Mr. W. Howitt of Perth. On the jarrah table was a pearl dessert service mounted in silver; the design of this service, which was made to order, comprised silver swans as the handles of the plates, each of which was composed of a single pearl shell, the fruit dishes being formed of a very large pearl shell with silver swans for the base. This service was very much admired. Other trophies consisted of wheat, flour, apples, leather, mallet bark, and saddlery.

The Mineral Section was also an attractive one. It was well filled by visitors, as a large quantity of gold exposed to view always attracts the public. In addition to the real gold there were models of bars showing in actual size the output of a number of mines in the Golden Mile for one month. The mineral trophy in this section, coloured with gold, silver, and copper, was covered with statistics giving the output of all the principal metals for a series of years.

A Notable Pearl.

One of the principal attractions of the Court was the Southern Cross Pearl. This great jewel, which is valued at £10,000, was kindly lent for exhibition by Mr. C. Peto Bennett, of Lombard Street. This extraordinary pearl, or cluster of pearls, known as "The Southern Cross," is probably the most remarkable production of its kind that Nature has ever evolved. So far as it is known it occupies an absolutely unique position in the history of pearls. It consists of a group of nine pearls naturally grown together in so regular a manner as to form an almost perfect Latin cross. Seven pearls compose the shaft, which measures one and a half inches in length, while the two arms of the cross are formed by one pearl on either side, almost opposite to the second, reckoning from the top downwards. It was discovered by a man named Clarke while pearl fishing at Roebourne, in the schooner "Ethel," the owner of which was a Roman Catholic called Shiner Kelly. On finding the pearl all the occupants of the boat were filled with dismay, regarding it as some heaven-wrought miracle, and with a certain amount of superstitious dread, buried it for some time. The pearl was re-discovered in 1874, and in 1879 an Australian explorer, the late Mr. Alex. Forrest, saw it in Roebourne. The pearl has changed hands many times and each time has been said to endow the purchaser with extraordinary good fortune. It was exhibited in a prominent position in the Western Australian Court in the Colonial and Indian Exhibition of 1886. During the time it was on view at the Franco-British Exhibition it was a great source of attraction.

Opinions of the Court.

The London daily and weekly papers gave the Western Australian Court splendid notices for its exhibit. Many of these notices have been cut out and placed in a book for reference and are available to any reader.



Western Australian Court. Jarrah Furniture, and Wild Flower Paintings.

Sir Henry Weedon, Lord Mayor of Melbourne, who was Commissioner for Victoria at the Exhibition, on passing through Fremantle on the return trip, said (*vide West Australian* of August 19th, 1908), "The Western Australian Court is a very striking one, and perhaps attracts the greatest attention in the Australian building. The exhibits are placed before the public in an attractive form, which redounds greatly to the credit of your State, and put those of the other States completely in the shade. Victoria, for instance, should have made a much better show, and I have no doubt we would have done so had we not met with such hostile criticism over the project. Certain it is that the Western Australian Court was always crowded with throngs of sight-seers who appeared to be greatly impressed by what they saw."

Mr. George Musgrove, the well-known theatrical manager, who should be an authority on attractions, on passing through Fremantle in the R.M.S. "Macedonia," said (*vide West Australian* of July 22nd, 1908), "The Western Australian exhibit was the best of all the States and it was wonderful to see the amount of attention it received. Compared with it the Courts of the other States were poor affairs."

Other Courts: The Canadian.

The other Australian States, New South Wales, Victoria, Queensland, South Australia, and Tasmania, all had good exhibits, and the Australian Court as a whole was without doubt one of the greatest attractions of the Exhibition.

The greatest rival to Australia was the Canadian exhibit. The Canadian Court was a most imposing one, but was not ready until nearly a month after the opening of the Exhibition, consequently was not seen by the King on the occasion of His Majesty's visit.

The designers of the Canadian Court spared no efforts to produce scenic results, and although I do not think they had the same quantity of exhibits as Australia, they, without doubt, produced wonderful show effects. All the walls and roof of the Court were covered by imitation tree trunks, with branches and leaves running out in all directions, worked in heads of wheat without the straw. Most of the wheat was of the bearded variety, and although this method of showing was attractive, it did not show the quality of the grain. At intervals between these trees were large painted panels of Canadian farms, wheat fields, stock, etc. These being of a transparent nature, and lighted from behind by electric light, made them show up very well and were no doubt a triumph of the sign-painter's art. In the centre of the building, under the dome, was an immense structure covered with red felt on which were nailed wheat heads arranged in fantastic styles. In the alcoves of this structure, which was octagonal in shape, were arranged alternately transparent pictures of the British Royal Family, His Majesty the King, Her Majesty the Queen, and the Prince and Princess of Wales. The boldness and size of this central trophy attracted everyone's attention, though very little grain would be used in its erection. Close by this was a very large refrigerator, in several chambers of which the sides were made of plate glass, and in each of these chambers scenic effect was the object of the designer. In one were life size models of King Edward VII. and President Fallieres shaking hands, executed solely in Canadian butter, in another chamber was a scene in which were numbers of figures and a boat with oars, etc., all constructed life size

out of Canadian butter, representing the meeting of Jacques Cartier and Donnacona in Canada in 1535—a party of Europeans landing and Indians on the shore. In another chamber were models of celebrities, baskets of flowers, and other subjects all modelled in butter. These chambers were kept at freezing point and the butter remained solid and clean for the whole length of the Exhibition.

Another section of the Court showed a panoramic view of an apple orchard with the fruit hanging on the trees and men at work gathering and piling it in heaps preparatory to packing it in cases. Another section was given up to a panoramic view of a Canadian prairie, now converted into a farming district, and several homesteads were depicted with young trees growing round them, the binders at work in the wheat fields, and everything as true to Nature as the painter's art could make it.

The exhibits of Canada and Australia were somewhat on different lines. Australia showed more actual products, and Canada went in more for scenic effects, and from what I can gather the expense in connection with the Canadian Court was very much greater than that of Australia.

Benefit of the Exhibition.

The Exhibition was opened to the public from May 18th to October 31st, 1908, a period of 5½ months, and during that time the total attendances, according to Mr. Imrie Kiralfy, was 12,000,000, while the greatest number who attended in any one day was 220,000, and it may be taken for granted that 95 per cent. of these people passed through the Western Australian Court.

Enquiries as to Western Australia as a field for emigration were numerous, and from morning till night there was a stream of visitors coming into my office seeking information with regard to the products and prospects of Western Australia; in addition, a large number of enquiries were dealt with by Mr. Neville and the employees on the floor of the Court. The increased business now being carried out with regard to emigration in the Agent General's Office, Victoria Street, Westminster, is no doubt largely due to the display at the Franco-British Exhibition.

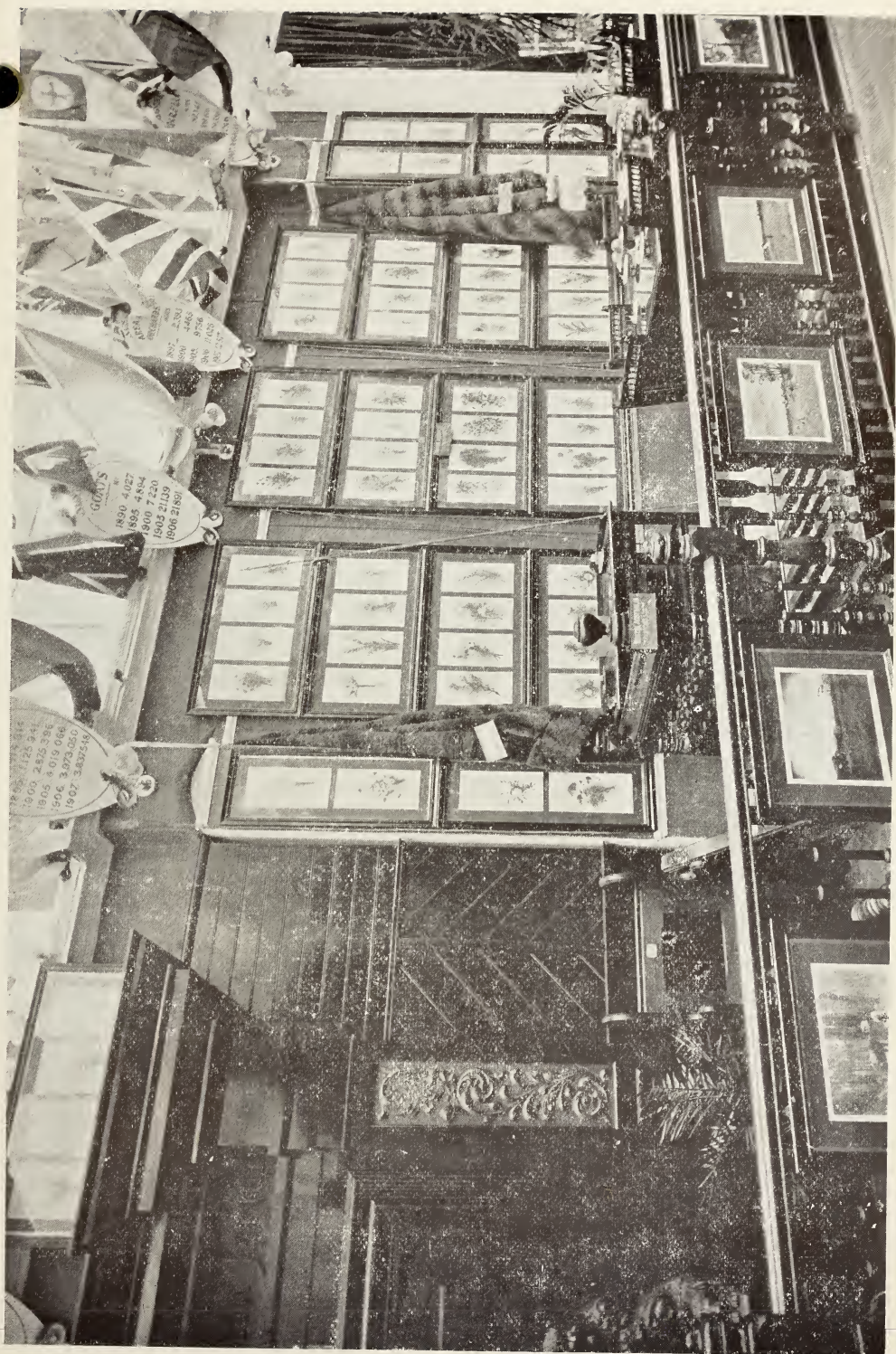
Awards.

That our exhibits were well displayed and appreciated is evidenced by the fact that we obtained 112 awards, as follows:—

Hors Concours	..	..	..	..	..	1
Grand Prix	..	..	..	..	..	22
Diploma of Honour	..	..	..	..	..	9
Gold Medal	..	..	..	..	..	45
Silver Medal	..	..	..	..	..	25
Bronze Medal	..	..	..	..	..	7
Honourable Mention	..	..	..	..	..	3

112

[Appendix No. 1 gives a complete list of the prizes awarded.]



Western Australian Court, Furniture, and Wild Flower Paintings.

This is a very satisfactory result when compared with the prizes won in Paris in 1900, which were as follows:—

Grand Prix	..	..	..	..	..	..	4
Gold Medal	..	..	..	..	..	..	3
Silver Medal	..	..	..	..	..	..	7
Bronze Medal	..	..	..	..	..	..	12
Honourable Mention	..	..	..	..	..	..	7
						—	33
						—	

With the exception of the Mineral Section, we obtained an award for practically every exhibit, except a few samples of wheat, in the Court, and this can only be regarded as satisfactory.

Cost of the Court.

In this report I have not touched on matters in connection with the building, as this was carried out by the Committee of the Agents General of the various States in London, and was paid for out of a fund not under the control of this Board. On my arrival in London I found the space at our disposal utterly insufficient to display the exhibits, and the Resident Commissioner approved of an Annexe of 30ft. x 20ft. being erected outside the building, to contain our heavy exhibits of logs of timber, coal, etc. This was erected under my supervision, at the same time as the fitting up of the Court.

The fitting up of the Court was carried out under great difficulties, as the building was in a most incomplete state. We were fortunate in securing the services of Messrs. Sage & Co. to do the work of fitting up our Court, as owing to their position as leading shop-fitters in London, the work was satisfactorily carried out and up to time, and we had none of the disadvantages and disputes which the other Courts experienced with their contractors.

As soon as the Exhibition was closed the work of packing up and dismantling the Court was commenced, and on December 7th the last of the exhibits was removed from the Court. The Western Australian Court was the first to be clear of the building, the same as it was the first to be opened.

The expense of fitting up and maintaining the Court in London was somewhat in excess of expectations, owing to the difficulties we had to contend with and of getting exhibits on to the ground. The cost of maintenance was also slightly in excess owing to the number of enquiries and the business done exceeding expectations. During part of the time it was necessary to employ two typists to cope with the correspondence, lists of exhibits, and other work. An illustrated catalogue and souvenir was distributed amongst visitors in the Court.

At the close of the exhibition, fittings, fixtures, etc., were an absolute slump, being quite unsaleable. Many exhibitors spent £1,000 or more on a fixture, and had finally to pay someone to cart it away. One instance was the central mineral trophy in the Australian Court, which cost somewhere about £800 to construct, and after remaining until the building was cleared in the endeavour to sell it, it had eventually to be removed at a cost of £22. I was fairly successful in disposing of all our fittings, which were mostly of Western Australian wood, for a small sum, but nothing like their value.

Balance Sheet.

The balance sheet of the expenditure in connection with the Exhibition will be as follows:—

London Expenditure—

	£	s.	d.
Mining Section	1,010	8	2
Agricultural Section	26	13	11
Mounting Pearl Shell, Dessert Service ..	30	0	0
Literature	26	15	0
Cases and Packing	157	1	7
Fitting up Court and Maintenance ..	1,886	6	10
Salary and expenses of Officer in charge ..	429	16	7
	<hr/>		
Total Expenses	£3,567	2	1
	<hr/>		

Expenditure in Perth is as follows:—

	£	s.	d.
Mining and Gold	4,481	11	9
Agriculture	345	7	6
Timber and Forestry	464	19	5
Miscellaneous Exhibits	993	0	4
Lands Department—Maps and Literature..	1,049	1	3
Cases, Packing and Freight	508	12	1
Clerical Assistance	172	7	3
Fitting up Court in London (Arch) ..	81	5	0
Expenses of Officer in charge	231	15	1
	<hr/>		
	£8,327	19	8
	<hr/>		
Total Expenditure	£11,895	1	9
	<hr/>		

Receipts in London—

	£	s.	d.
By sale of Gold Specimens	2,165	14	11
By sale of Sundry Exhibits, Fittings, etc...	200	3	6
Value of Exhibits transferred to Agent General	1,124	18	0
Value of Exhibits sent to Imperial Institute	8	12	0
	<hr/>		
	£3,509	7	5
	<hr/>		

Receipts in Perth—

	£	s.	d.
Cash Receipts Perth Refunds	42	13	7
Value of gold sold by Geological Survey Department	324	17	5
	<hr/>		
	£367	11	0
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Western Australian Court. Map of State, Wool and Grain Exhibits.

Other items to be credited Perth—

	£	s.	d.
Agent General, four books of photographs	40	0	0
Jarrah Arch returned, now with Government Storekeeper	80	0	0
One Panel "Faust," Carved Jarrah, Forestry Department	15	0	0
Four large Jarrah Frames, Public Works Department	20	0	0
Typewriter, Flags, Sundries .. .. .	..	
Value of Mineral Collection returned to Perth .. .. .	..	
	£155	0	0

	£	s.	d.
Total Expenses	11,895	1	9
Total Cash Receipts	2,733	9	5
Total Credits for Transfer of Exhibits	1,288	10	0
Net cost less receipts and transferred exhibits	£7,873	2	4

Amount of Vote—£16,000.

This constitutes all the expenditure in connection with the Exhibition which has been incurred and paid with the sanction of the Board; there may be a few other items paid for expenditure not incurred by the Board. There is also the expenditure of the Agent General in London for space and building, for which the expenditure of £8,000 was granted, but this was not under the control of the Board. The expenditure will compare most favourably with that incurred for the Paris Exhibition, which was £29,762 17s. 8d., in addition to which £12,880 was expended in the purchase of gold. In the attached list, every exhibit purchased by or loaned to the Board has been accounted for.

The Mineral exhibit which was collected at considerable expense, has been returned to the State and is now in the Geological Survey Department. It will be noticed that no value has been placed on this for purpose of transfer, but if this were done, the balance sheet would be more favourable still.

Conclusion.

On the presentation of this report, with the exception of the distribution of the awards, which have not yet come to hand, the work in connection with the Franco-British Exhibition Board will be completed, and I trust it will be admitted that the representation of this State at the Exhibition has been carried out at a minimum of expense.

The medals and diplomas are not yet to hand, but arrangements have been made with the Agent General to secure the diplomas and such of the medals as are required and to pay for them in London, and the amount can be collected here on delivery and credited to his vote.

In conclusion, I should like to express my thanks to the Agent General (Mr. C. H. Rason) for the valuable assistance he rendered while I was in London, and also to Mr. C. Temperley, of Millars' Karri and Jarrah Company, London, for his valuable aid in making the Western Australian Court popular and in bringing visitors to the exhibits.

The thanks of the Board are also due to those who loaned or otherwise supplied exhibits.

I have, etc.,

PERCY G. WICKEN,
Secretary, Franco-British Exhibition Board.

APPENDICES.

No. 1.—List of Awards.

No. 2.—List of Exhibits transferred to Agent General in London.

No. 3.—Letter addressed by Mr. Rason to Mr. Imrie Kiralfy with regard to the benefit Western Australia derived from the Exhibition.

APPENDIX I.—AWARDS.

Hors Concours.

Exhibitor.	Exhibits.
Government of W.A.—	Fisheries.

Grand Prix.

State Primary Schools—Sloyd Work.

Government of W.A.—Maps.

Government of W.A.—Test Work: Steel and Wood.

Government of W.A.—Plans of Public Works.

Government of W.A.—Wheelwrights' Work.

Government of W.A.—Photos. of W.A. Railway Workshops.

Siebe, Gorman, & Co.—Diving Apparatus.

Government of W.A.—Hops and Grain.

Government of W.A.—Honey.

Government of W.A.—Apples, Pears, Grapes, Oranges, Mandarines, and Raisins.

Government of W.A.—Panels and Timber.

Government of W.A.—Specimens of W.A. Fauna.

Government of W.A.—Collection of Minerals.

Government of W.A.—Collection of Hardwood Timber.

Government of W.A.—Collection of Oils.

Government of W.A.—Inkstand of W.A. Timber.

Dorrington, Mrs.—Paintings of Wild Flowers.

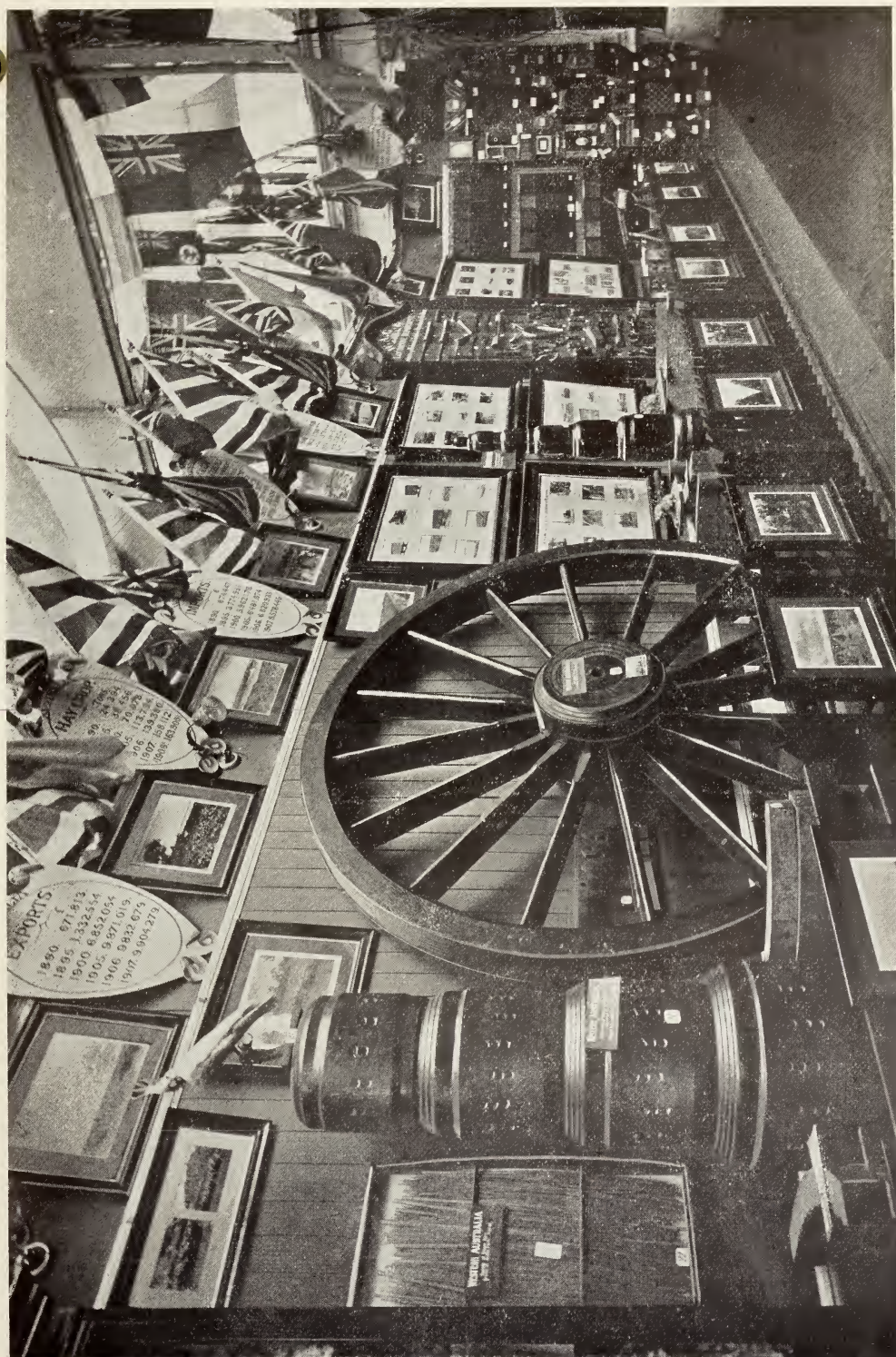
The Great Boulder Co. Proprietary—Gold Specimens.

Johnson & Son—Smelting Works, Ltd.

Pilbara Asbestos Coy.—Asbestos.

Council of W.A. Mine Owners—Models of Gold Output.

W. Howitt—Carved Jarrah Furniture.



Western Australian Court. Whim Wheel, Jarrah Fencing, etc.

Diploma of Honour.

Perth Technical Schools—Art Drawing.
 Heinke, C. E., & Co.—Diving Apparatus.
 Glaser, C.—Whim Wheel and Nave.
 Rosenstamm, B.—Leather.
 Anderson, Ross—Wool.
 Government, W.A.—Wool.
 A. Y. Hassell, Albany—Wool.
 State Farm, Hamel—Cotton.
 Bennett, C. P.—Southern Cross Pearl.

Gold Medal.

Thomas, A. E., Esq.—Collection of Mineral Specimens.
 Rhys, F., Esq.—Collection of Quartz.
 W.A. Museum—Collection of Rocks and Minerals.
 W.A. Railway Department—Thermit Welding Process.
 Madeley, Ed. G.—Carved Jarrah Chairs.
 Greenham & Evans—Photographs.
 Lang, W. H.—Tuart Felloes.
 Government, W.A.—Guano.
 Piesse, F. & C.—Wheat.
 Evans, T.—Wheat.
 Farm (State), Chapman—Wheat.
 Bunbury Co-operative Butter Factory—Fresh Butter.
 Bunbury Co-operative Butter Factory—Salt Butter.
 Government, W.A.—Fibre from Agave Rigida.
 Wilding, T.—Wool.
 Burt, Hon. Sept.—Wool.
 Elliott, S. E. R.—Wool.
 Grant, W. Mackenzie—Wool.
 Davidson, C. H.—Wool.
 Wishart, F.—Honey.
 Withnell Bros.—Wool.
 Smith, A. H.—Honey.
 Guildford Bee Company—Honey.
 Mead & Layton—Honey.
 Barrett, G. L.—Grapes.
 Cox, J. N.—Raisins.
 Sounness & Son—Pears and Apples.
 Walters, T.—Apples.
 Price, T.—Apples.
 Keal, J.—Apples.
 Lang, W. H.—Tuart Timber.
 Wills & Co.—Mallett Bark.
 Aeme Paving Co.—Paving Blocks.
 Aeme Paving Co.—Sectional Blocks.
 Millars' Karri and Jarrah Co.—Railway Sleepers.
 Government of W.A.—Collection of Native Weapons.
 W.A. Museum—Aboriginal Relics.
 Government of W.A.—Flour.

Harvey & Edwards—Flour.
Padbury, W.—Flour.
New Norcia—Maccaroni.
Gillespie, J.—Flour.
Piesse, F. & C.—Flour.
Ferguson, G. W.—Wines.
Piesse, F. & C.—Wines.

Silver Medal.

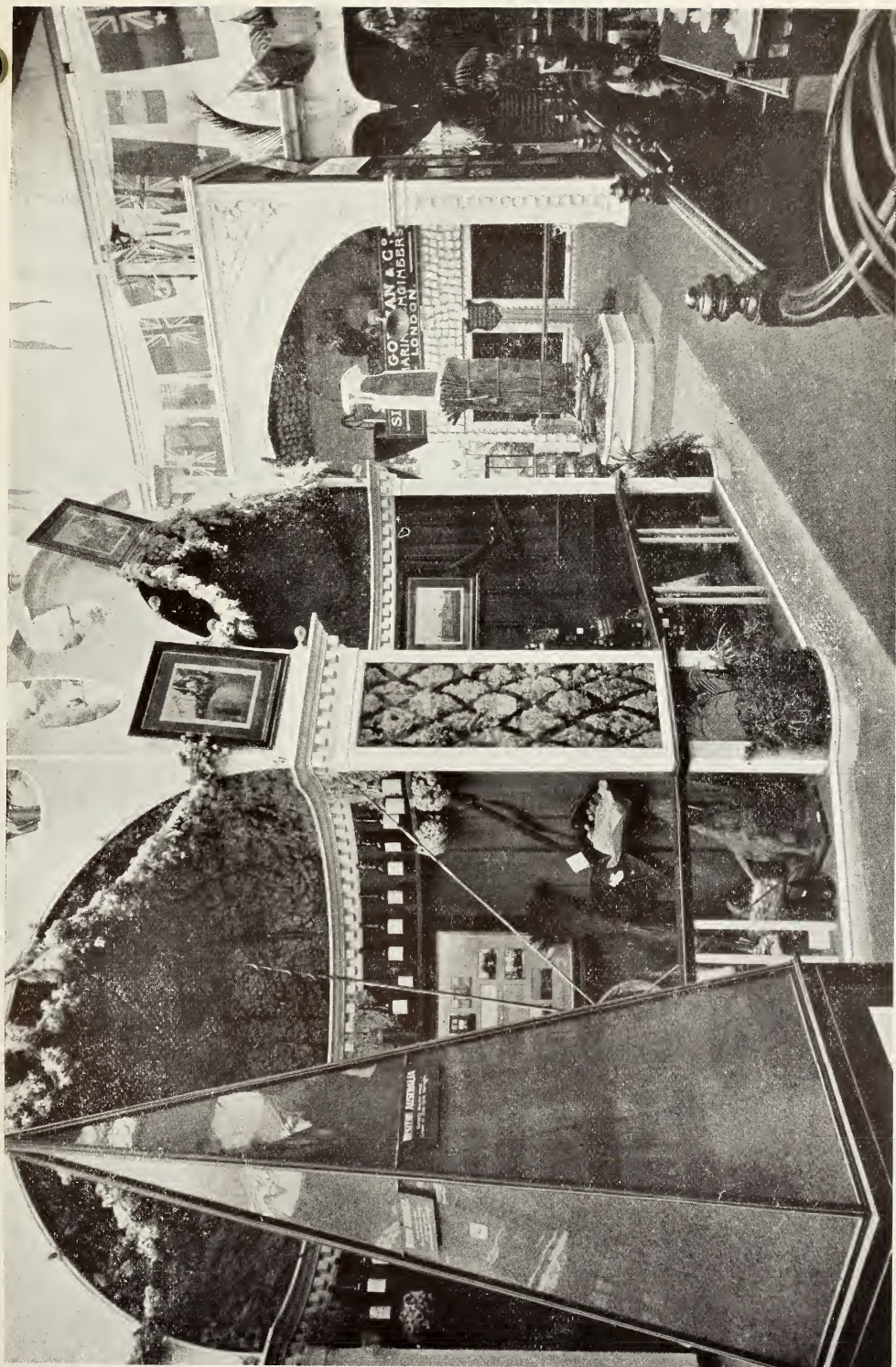
Government of W.A.—Statistical Shields.
Campbell & Robertson—Wheat.
Grigson, A.—Wheat.
Shields, W. H.—Wheat.
Farmer & Meldrum—Wheat.
Whitehead, L.—Wheat.
Matthews, B.—Wheat and Oats.
Beck, H.—Barley.
Fisher, S. R.—Wheat.
McDougall, H. J.—Wheat.
Marwick Bros.—Wheat, Oats, and Barley.
State Farm, Hamel—Wheat and Grain.
State Farm, Narrogin—Wheat.
Walker Bros.—Wheat.
Government of W.A.—Collection of Fruits.
Mr. H. F. Johnston—Collection of Everlasting Flowers.
Cunningham, J.—Collection of Birds.
Lippert, O.—Stuffed Birds and Animals.
Dawe, C. & F.—Preserved Sea Mullet.
Tuckey Bros.—Herrings.
Santa Rosa—Wines.
Coorinji Vineyard Co.—Wines.
Cook, S.—Inlaid Chair.
Whittaker Bros.—Jarrah Turnery.
New Norcia Mission—Olive Oil.

Bronze Medals.

Capt. Armstrong—Sponges.
Capt. Biddles—Pearl Shell.
Dbideend (J. Duce)—Wines.
Mitchell, A. D.—Eucalyptus Oils.
Rosenstamm, B.—Saddlery.
Gorer, G. L., & Co.—Pearl Shell.
W. A. Brushware Co.—Brushware.

Honourable Mention.

New Norcia Mission—Snuff.
Government of W.A.—Silversmith work.
Gorer, G. L., & Co.—Silversmith Work.



Western Australian Court. Wheat Pyramid, Central Trophy, and Diving Tank.

APPENDIX II.—EXHIBITS TRANSFERRED TO THE AGENT GENERAL IN LONDON.

Number.	Article.	Price.	Total.
			£ s. d.
26 pieces	Old Jarrah timber sleepers, Bridge work, etc.	<i>Nil</i>	
6 pieces	Section of Jarrah Bridge	<i>Nil</i>	
12	Tuart Felloes	3s. each ..	1 16 0
1	Pipe, Coolgardie Water	<i>Nil</i>	
1	Grey Kangaroo	£5 10s. ..	5 10 0
1	Red Kangaroo	£7	7 0 0
1	Emu	£5	5 0 0
3	Black Swans	£3 each ..	9 0 0
1	White-bellied Sea Eagle	£2 10s. ..	2 10 0
1	Wedge Tail Eagle	£2 10s. ..	2 10 0
6	Parrots	10s. each ..	3 0 0
2	Cockatoos	15s. each ..	1 10 0
1	Darter	£1 15s. ..	1 15 0
2	Ant Eaters	£1 17s. 6d. ea.	3 15 0
2	Brush Tail Wallabies	£5 each ..	10 0 0
2	Opossums	£1 5s. each..	2 10 0
2	Pelicans	£2 10s. each	5 0 0
1	Hedgehog	£2 15s. each	2 15 0
1	Crane	£3 10s. ..	3 10 0
1	Bustard	£3 10s. ..	3 10 0
2	Noddy Terns	17s. 6d. ..	1 15 0
1	Crocodile.. ..	£3 10s. ..	3 10 0
1	Turtle	£5	5 0 0
2	Native Cats	£1 each ..	2 0 0
4 boxes	Hops from Hamel	5s. each ..	1 0 0
6 boxes	Grain from Hamel	£1 each ..	6 0 0
43	Tuart Felloes	3s. each ..	6 9 0
1	Jarrah Table, carved legs	£28	28 0 0
1	Sideboard	£57	57 0 0
6	Jarrah Chairs	£6	36 0 0
3	Jarrah Chairs	£3	9 0 0
2	Gothic Chairs	£10	20 0 0
2	Chippendale Chairs	£5	10 0 0
1	Dinner Waggon	£12	12 0 0
1	Music Cabinet	£20	20 0 0
1	Inlaid Table	£10	10 0 0
1	Section Board, Jarrah Turnery ..	£8	8 0 0
17	Pieces Jarrah, also Doorway, paneling, etc.	£30	30 0 0
145	Small photographs, framed, W.A. woods	15s. each ..	108 0 0
2	Large photographs, framed, W.A. woods	£2 10s. each	5 0 0
6	Large photographs, framed, W.A. woods	£5 each ..	30 0 0
14	Mineral maps	<i>Nil</i>	
32	Statistical shields	£1 each ..	32 0 0
4	Glass cases	£7	28 0 0
6 dozen (about.)	Glass bottles containing soils and seeds	£1 5s. per doz.	7 10 0
54	Fleeces Wool, averaging approximately 378lbs.	..	18 18 0
1	Nine-foot Wheel : York Gum Nave, Morrell spokes, and Tuart felloes	£14 10s. ..	14 10 0
15	Naves from 26in. to 2in. diameter. Larger size Wandoo, smaller size, York Gum	£14 14s. ..	14 14 0
	Carried forward .. ..	..	589 8 0

APPENDIX II.—*continued.*

Number.	Article.	Price.	Total.
	Brought forward .. ..	..	£ s. d. 589 8 0
1	Grey Opossum Rug	£9	9 0 0
1	Black Opossum Rug	£15	15 0 0
1	Pearl Dessert Service, mounted in silver, cost of mounting	£30	30 0 0
1	Bottle Eucalyptus Oil	£1	1 0 0
1	Bottle Melaleuca Oil	£1	1 0 0
1	Bottle Sandalwood Oil	£1	1 0 0
4	Cases Santa Rosa Wine	£1 each ..	4 0 0
1	Carved Jarrah Door	£20	20 0 0
1 piece	Carved Jarrah Dado	£20	20 0 0
1 set	Panels of W. A. timber with foliage carved thereon	£27	27 0 0
2	Jarrah Picket Boards	£1 each ..	2 0 0
8 bushels	Wheat	5s. per bus.	2 0 0
300	Lantern Slides .. ..	.. ..	22 10 0
	Map of W.A., and roller	£75	75 0 0
	Aboriginal Weapons and Spears ..	£10	10 0 0
	Paper Knives, curios, etc. .. ..	.. ..	5 0 0
2	Large flat cases	£20 each ..	40 0 0
25	Bags of Grain, 4 bus. at	5s. per bus. ..	1 0 0
25	Show Bottles, at	2s. each ..	2 10 0
40	Bottles of Seed	1s. 6d. each	3 0 0
1	Box Hops .. ..	.. ..	0 5 0
11	Agricultural Photos, at	15s. each ..	8 5 0
	Broom Corn and Peanuts .. ..	.. ..	1 0 0
4	Curly jarrah table legs .. ..	.. ..	5 0 0
5	Fleeces Wool, 40lbs., at	1s. lb. ..	2 0 0
2	Fire Extinguishers .. ..	.. ..	6 10 0
1	Filter .. ..	.. ..	2 10 0
			949 8 0
	OTHER FITTINGS, LONDON.		
3	Door Mats, W. A. worked therein ..	£12 10s.	
1	Wax figure Miner and 1 Mineral Trophy	£88	
100	Gold bricks	£22 10s.	
2	Pyramid cases for Wheat	£24	
1	Leather Trophy	£28	
1	Apple Trophy	£68	
1	Extension Ladder	10s.	
22	Bundles roll-up Matting	£90	
	Tools, Tins, Brushes, etc.	£5	
	Less 50 per cent. discount	£338 10s.	169 5 0
	Total .. ..	..	£1,118 13 0



Western Australian Court. General View.

APPENDIX III.—REPORT ADDRESSED TO IMRIE KIRALFY, ESQ. BY THE
AGENT GENERAL.

18th November, 1908.

Sir,—I have the honour to report that, on behalf of Western Australia, I am entirely satisfied with the success of the Franco-British Exhibition now brought to a close.

The Western Australian Court enjoyed the unique distinction of being entirely complete on the opening day, Thursday, May 14th. From that date to the last moment of closing of the Exhibition there was a constant stream of visitors, the Court being nearly filled—often crowded. On Tuesday, 26th May, we were honoured with a visit by His Majesty the King and the President of the French Republic.

The exhibits in the Western Australian Court bore descriptive labels in French as well as in English—the catalogues and most of the literature distributed also being printed in both languages. This attention to our French friends was apparently much appreciated.

In my opinion, the participation by Western Australia in this Exhibition is having, and will continue to have, a very salutary effect upon the trade, commerce, and general development of that portion of the Empire.

It has undoubtedly had a very valuable educational effect, not only upon the people of the United Kingdom but those of other countries, the majority of whom were previously unaware of the great resources of Western Australia.

I hope and have every reason to believe that the most beneficial effects will result from the Exhibition generally.

I have, etc.,
C. H. RASON.

MIXED FARMING IN WESTERN AUSTRALIA.

The Director of Agriculture delivered a lecture at Brunswick on the 4th instant on the subject of Mixed Farming.

Value of Western Australian Lands.

He said that the subject upon which he had been asked to address them was too extensive to be dealt with within the limits of a short evening, covering as it did the matters of cropping, sheep, dairying, pigs, and all minor industries. Continuing, he said that in connection with the agriculture of the State he had noticed, more especially amongst the people of Perth, a tendency to discount the capacity of the lands. Beyond question there was a very wide area of inferior land, but that inferior land, sand plain though it was, in his opinion was well worth the three or four shillings per acre at which it could be purchased outright, whilst there were extensive areas of moderate lands which could be made highly remunerative, and as everywhere else a limited area of really first-class fertile land. In proof that the position for the agriculturists in Western Australia was a strong one, he referred his

audience to the tables of statistics for the Commonwealth. It might there be noticed that in the total area under crop per thousand of population Western Australia stood third, but what was more important was that in the quantity of wheat grown per thousand of population Western Australia was second, and that the average of this State for the seven years in which the Commonwealth statistics had been recorded was nearly $2\frac{1}{3}$ bushels above the average of the Commonwealth. Add to that the fact, as was revealed in other tables, that the proportion under orchards relative to the total area of cultivated land was higher in Western Australia than in the other States with the exception of Tasmania, and bearing in mind that the returns from land devoted to fruit-growing were considerably higher per acre, it meant that the position was so much stronger. Further, if they took the trouble to take out the figures in which there was set out the value per head of population of the agricultural produce, viz., cereals, pastoral and dairying products and timber, they would find that Western Australia compared with Victoria and New South Wales. The position, therefore, was an encouraging one, and there was not the slightest doubt that a very great agricultural development was before this State. It was not to be expected that all the men who were taking up land would succeed, for farming like any other business required learning, and in his opinion required more learning than the average trade, such as carpentry and plumbing. A big percentage of the community did not fully realise that until they had gone upon the land and found at their expense that the business did require learning. Another matter which probably would react against the reputation of Western Australian lands was the fact that a considerable percentage of those taking up blocks were endeavouring to work the land without relinquishing their business or profession. Those men had to depend upon managers, but under the condition of things on the land such as obtained, the really valuable manager was blazing a track for himself, and the kind of man who could be got for £200 per annum, and was worth it, was very difficult to find, because although he might not make £200 a year right away when working for himself, he as a good practical man would know that what he was making and the improvement he was effecting to the capital value of the property he was taking up would mean in the end a better remuneration for him than would the £200 or so he would have had as manager. Thus it happened that some were disappointed or would be disappointed, when the explanation of the disappointment did not altogether lie with the capacity of the land.

Treatment of Brunswick Soils.

Dealing with the Brunswick district particularly he enumerated some of the essentials to success, some of the desirable practices not generally adopted, and some of the innovations not yet tried. The most important factor, he considered, towards increasing the returns from the land and improving the position in that district would be lime. The rainfall was heavy (30 inches and over), the land had carried heavy timber, very often it was waterlogged, it was frequently sour, and that sourness was to be overcome by the judicious use of quicklime, by the more extensive employment of the ditching plough, and by more thorough tillage. All over the world it was characteristic of soils formed as in that district, that they benefited by lime. It might not be altogether required as a plant-food, but it certainly was required as an amendment. Its sweetening influence by counter-



Western Australian Court. Entrance from Central Hall.

acting the organic acids in the soil gave opportunity for increased ferment action, and the bringing about of those changes which resulted in increased plant food in the soil. At the same time it would help to make the country more healthful for stock. Such food as was grown would be more nutritious, and stock would thrive better on it, whilst it would also have a useful physical effect upon the soil. He thought that he could not urge upon the farmers anything likely to be more immediately valuable to them than the extensive use of quicklime, and he recommended that an endeavour should be made to get ground quicklime. He was doubtful if there was a plant in the State to grind lime as it came from the kiln, but he had no doubt that if the demand arose for it through the creation among the farmers of a desire to use it, business men would soon come forward with the mill or mills. In New Zealand, for instance, farmers could have ground quicklime at £1 per ton, provided they sent their own secondhand bags in which to bag it, and the railways carried it 100 miles free in appreciation of the fact that if the farmers used the lime so carried for agricultural purposes the additional traffic resulting would go far to compensate for the free carriage. The quantity per acre that was used nowadays was very much less than in the old country a few years ago. In the north of England and in Scotland farmers would apply six tons, and even up to eight tons, of quicklime at a dressing, broadcasting it with a shovel. Now the practice was to apply ground quicklime, screened, so that it would run freely through the drill, and apply it frequently. The old heavy dressing was applied once in a lease of, say, 19 years; now five and seven cwt. were applied at frequent intervals immediately preceding the crop. That was the practice which he thought would be desirable for the farmers in the Brunswick district if they could bring it about that the quicklime was placed in the market at a reasonable figure. Failing the ground quicklime, however, he would recommend their using the lime ash such as could be had from some of the limekilns in the State. Another essential in Western Australia, as elsewhere in Australia, was a judicious use of phosphatic manures. The farmer had his choice—superphosphate, basic slag, bonedust, or phosphatic guano. He would not recommend the use of bonedust for these reasons:—(1) The price was such that the farmer paid too much for his whistle; (2) in using bonedust there was danger of introducing disease, to wit anthrax, which it was known had been introduced into other countries, directly traceable to the imported bonedust. If the bonedust was on the market at a figure relatively cheap, there might be some inducement to use it, and take the risks of introducing disease, but while it was dear there was no justification whatever for using it. It was dear because bonedust was traditionally a phosphatic manure. Farmers had seen it used from their youth upwards, and had a confidence in it that they had not in other manures. At any rate they had been in the habit of thinking it more reliable, and that often without trying the other phosphatic forms alongside of it. A good bonedust was a reliable and very useful manure, without question, but he held that the considerations he had already mentioned justified him in advising farmers to let it alone, unless they were thoroughly satisfied that it was manufactured from bones not likely to be a source of disease—a satisfaction very difficult to secure. He would recommend for their attention superphosphate on older cultivated lands where the drainage was good and the soil had been sweetened by aeration, but on the sourer land or the newer land basic slag was likely to suit their purpose better than superphosphate, as the latter tended to increase the acidity, whilst basic slag,

having a proportion of free lime in it (some 12 per cent.), reduced acidity. At the same time their soils having a higher proportion of organic matter in them than the soils of some of the drier districts of the State, and through the agency of organic matter in its products, utilised the less soluble phosphate better. Another phosphatic manure well worth their consideration was phosphatic guano, such as was now being obtained by the Government in the caves lately discovered, and had been obtained for some time from some of the islands on the coast of Australia. He would not recommend that guano should be used for the drier districts, and certainly not for limestone districts in the belief that superphosphate under those conditions would be much more useful, but if there was any place where phosphatic manures could be used to advantage it was in those wetter districts where, on the flats at any rate, the land had more organic matter in it, and where, therefore, the less soluble phosphate could be brought into availability. They would understand, then, that it was not for the farmer nowadays to use manures in a haphazard manner, or to be careless as to the brand or source of the manure he used in the belief that there would be very little difference in the ultimate effect. It was for every farmer to make his holding a field of research. No experimental farm, however close to his boundaries, could be an absolute guide for the conditions under which he was working, because the results of any experimental farm would depend on just those conditions which modified the results on the ordinary farm, viz., character of soil, its approximate constituents, the system of farming to which it had been submitted, and the cropping that had been drawn from it. The farmer, therefore, could be only guided by the experimental farm, or he might get certain suggestions, but profitable practice for his conditions had to be worked out by himself, and nowadays with the use of the drill it was so easy for the farmer to apply different manures and different mixtures of manures, a few acres of each, and be guided by the results. If he did that he would find that one part of his farm might benefit more by superphosphate, another by basic slag, and there might even be parts where good phosphatic guano would be effective, and the mild carbonate of lime that formed a considerable proportion of it indirectly a benefit.

Lambs for Export.

In relation to crops the farmers knew well enough that grain-growing was not the game for that district. It was country for the dairy farmer and for stock, and if the most was to be made of the land, crops, with the exception perhaps of potatoes and oats, would be grown to the best advantage for the consumption of the stock on the farm. If attention was given more to sheep than to dairy cattle there might not be the same necessity for extensive cropping as there was in the case of a farm devoted to dairying, but unless forage crops were grown, and grown fairly widely, the best results would not be obtained even from sheep. In country such as this, where clearing was very expensive and was likely to continue expensive unless more wholesale methods be adopted, the wool cheque and the returns from the sale of sheep were not the means of making the best use of the land. There was no doubt that this State, as the other States had done, would in the near future develop an export trade in frozen mutton, and especially lambs. He had noticed the other day that someone was discounting in the newspapers the proposal to take initial steps for the establishment of the freezing industry, and was using as an argument against it the low price of lambs now ruling in London.

Surely farmers were not to be discouraged by an argument of that character. Would they have considered anyone discounting the growing of wheat a few years ago because wheat was only 2s. 6d. or less per bushel? Of course not; the same might apply to wool. They had seen wool down to 5d. and 6d., but they had also seen it at 1s., and what would be thought of anyone who tried to throw cold water over the pastoral industry because wool was low for the time being? As it happened there was a glut in London, but that glut had arisen because trade was depressed, the purchasing power of the people had been reduced, and at the same time there had been a great output from Argentina and from New Zealand, but as sure as there had been depressions in the past and recoveries therefrom so again would there be a better market than that now ruling. As things were at that very moment New Zealand farmers were selling their lambs at 13s. and 14s. in the yards at Canterbury. Some of them had not made much money because they bought store lambs at 12s. 6d., but even that 14s. here would be something well worth our farmers reaching out for, and that was the glut price not in London but in New Zealand.

Forage Crops.

However, before Australia could get a position worthy of it in the frozen meat market and get that good name which they would desire that it should have for its frozen produce, there must be a system of grading much more exacting than that which was now obtaining. And that the rejects in the process of grading might not be high it would be necessary for farmers to grow forage crops on which to thoroughly ripen their lambs—crops such as rape sown in the autumn, rape and vetches, peas and oats, peas, Cape barley and oats, kale, rape and mustard, mustard and rye, on the poorer lands. Some of those, such as rape and mustard, could be sown in the spring as well as in the autumn, and in some cases with better results. There would, of course, be danger, as summer wore on, of having the rape ruined by aphid; at the same time he believed that on well-worked land with, say, 2cwt. of good phosphatic manure on it rape sown in the spring would be found a useful means of topping up lambs in that district just as much as in New Zealand. Italian rye-grass was a grass which he urged on the attention of farmers. It had been sown at the State farm in the neighbourhood in April after the rains on land outside the irrigation area which had carried maize during the summer, and was certainly looking at the moment most promising. In fact, it was more than ready for being grazed down by sheep if it had been required for that purpose, and would have offered a very high carrying capacity for a while if sheep had been put on it. They could then have been taken out, the rye-grass given a spell, and the stock returned again in the spring. It was not to be thought that Italian rye-grass would be perennial in any sense. Some of it might survive the summer—that would depend upon the country in which it was placed—and a proportion of it might reseed itself, but on the whole it would have to be looked on as an annual as much as rye and Cape barley were annuals. He recommended from a bushel to 30lb. of that rye-grass as early in the autumn as was practicable after the first rains, and he was satisfied that whether for dairy cattle or for sheep it would be found returning profitable grazing in the early winter and in the spring.

There was not time to enter upon the whole range of crops, and he would therefore conclude by urging on the farmers, especially on those men who were doing something in dairying, to endeavour to get a succession of

succulent forages for their dairy cows, to make much more use of mixtures of leguminous plants and cereals sown in the autumn, such as mixtures of peas and oats and of maize, or maize and cow-peas, millets, and sorghums for the summer months. Permanent grasses as such were not likely to be found extensively successful, but there were on nearly every farm plots where lucerne could be grown profitably, and possibly cocksfoot, birdsfoot, trefoil, kidney vetch, crimson clover, or everyday couch, but he did not think that much time should be spent in trying to find permanent grasses, for he was confident that if the land got good systematic cultivation and was generously treated with manures it would be found to carry natural herbage—dandelions and geraniums—and natural grasses which would be more valuable than, say, a mixture of cocksfoot and perennial rye. What they wanted as sheep farmers were fattening forages to be grazed off; what they should endeavour for as dairy farmers were bulky and nutritious forages for soiling or ensilage.

WATER HORSES BEFORE FEEDING.

Professor F. W. Culver, Colorado, says:—A horse should be watered before feeding, and never given a large quantity of water after a meal, for the simple reason that the water will wash the food out of the stomach before stomach digestion has taken place, and the food will not be well prepared for absorption; and, beside, it is sometimes the cause of colic.

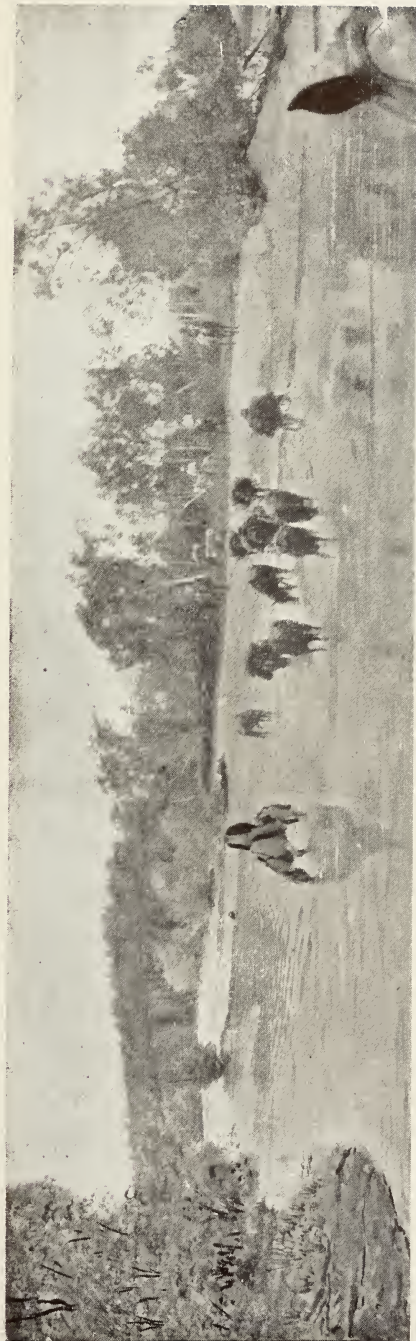
There is a popular idea that a warm horse should not be allowed to drink, and, unlike a great many other popular ideas, there is a little truth in it. If you water a warm horse in the ordinary way, letting him drink all that he will, you are likely to have a foundered horse on your hands. This is especially so if, at the time, the horse is fatigued.

Nevertheless, it is always safe to allow him from six to ten swallows, no matter how warm he is. If this be given on going into the stable, and he be allowed to stand and eat hay for an hour, and is then offered water, he will not drink nearly so much as he would had none been given before.

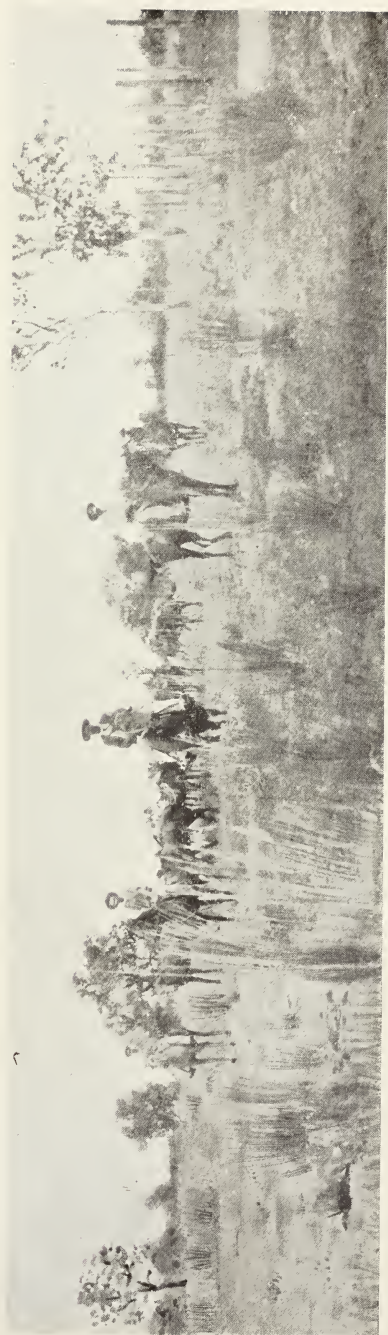
The danger is not in the first swallow, as we often hear it asserted, but in the excessive quantities he will drink if not restrained. The most dangerous time to give a horse a full draught is when he has cooled down from fatiguing work, and has partaken of a meal.

The general custom, almost universally followed, of giving the morning meal before water, is not very objectionable, either theoretically or practically. At this time there is no depletion of fluid, consequently the horse is not very thirsty, and does not drink rapidly or excessively, and apparently very little evil results from this method.

However, I much prefer that the horse should have an opportunity to drink before the morning meal. Personally, I much prefer keeping horses, both summer and winter, in an open shed, with a large water tank in the yard, to tying them by the head in a barn.



Crossing fine river—probably the Barton.



Party starting—J. Mitchell, J. Egan, Chas. Young, A. Haly

Blackboys in rear.



IN THE NORTH-WEST.

REPORT BY STOCK INSPECTOR.

The following notes of a recent journey through country west of Cambridge Gulf have been received by the Chief Inspector of Stock from Mr. Arthur Haly, stock inspector, which, with the accompanying illustrations, give a graphic description of the country in that portion of this State. The narrative is in the form of a diary, giving the daily progress of the trip:—

Journal kept by A. Haly, Inspector of Stock, East Kimberley, during a trip with Messrs. Chas. Young and party through country west of Cambridge Gulf. The party consisted of Chas. Young, J. Egan, J. Mitchell, A. Haly, and two black boys.

January 21st, 1909.—Left Parry's Creek, twenty miles from Wyndham, and travelled nine miles along the Hall's Creek road. Distance travelled, nine miles.

January 22nd.—Travelled along Hall's Creek road for about seven miles, then made S.W. to Hillgrove Station (Nelson & Johnson). Distance travelled, 18 miles.

January 23rd.—Travelled a due west course for 15 miles on to Limerick Creek, then W.N.W. for four miles, thence W. again for five miles. Distance travelled, 24 miles. No. 1 camp.

January 24th.—Started at 6 a.m. following Cattle Creek down to junction with Penticost River. Crossed river and followed down on W. side for five miles. Camped for dinner 10.30 a.m. Started again 3.10 p.m., taking N.W. course over some good country for about four miles to Salmond River. After crossing the river the country was poor, but was improving when we camped at 5.45 p.m. Distance travelled, 22 miles.

January 25th.—Started at 6.45 a.m., keeping N.W. course, passing over fine grassy ridges for five miles. Crossed a fair sized creek with good lilly holes. After crossing the creek the country became sandy but fair cattle country with plenty of edible bush. To the N.E. could be seen the Gulf, fringed by what appeared grassy plains. Struck a tidal arm and followed it up to the ranges. Had great difficulty negotiating the hills, very rough. Chestnut horse, "Chester," became overheated and died. Camped for dinner at 12 noon in a big gorgy creek. After dinner Egan and myself rode ahead over very rough ranges to look for a road across. Struck Durack River and returned to the camp. Distance travelled, 18 miles.

January 26th.—Started at 6.45 a.m., travelling W.N.W. over very rough hills. Struck Durack River and followed it up for about six miles to the head of the tidal water. Camped for dinner at 10 a.m. Started again at 2.30 p.m., crossed Durack River at an elbow, river flowing from S. then turning due E. Travelled N.N.E., crossed a fair sized creek junctioning with Durack River near the crossing place. Creek flowing from W., and appeared to have fine valley. Passed over some splendid pastoral country for four miles, good valleys and grassy ridges with big bohemia trees and orange bush. This class of country appeared to extend to the W. for eight or ten miles. Distance travelled, about 12 miles.

January 27th.—Started at 6.10 a.m., still keeping N.N.E. Good country extended for a further five miles to a nice creek. After crossing the creek the country became sandy, then we started to ascend a range. Travelling very rough for five miles. Camped for dinner at 12 noon on a coolibah flat, apparently about a mile square. Saw some fair sized cypress pine trees. This is valuable timber if it could be found in any quantity, as it is proof against white-ants. Started again at 4 p.m., keeping in the same direction for about two miles, then struck deep impassable gorges. Could see big valley (apparently valley of Forrest or Ernest Rivers) to the W., so made in that direction, but could not get down for steep cliffs. Returned and followed up the gorge, then made N. and camped after dark in a big gorge, having found water for ourselves but none for the horses. Distance travelled, 14 miles.

January 28th.—Started at 6.10 a.m., travelling N.N.E. for about a mile. Got water for the horses in a rock hole in a gully. Struck another big gorge and after some trouble got pack horses down into it. Saw several small clumps of cypress pine. Decided to follow the gorge down to the W. and get into the valley seen yesterday. Travelling exceedingly rough. After about three miles the country opened. Camped for dinner at 10.30 a.m. on some fine lilly lagoons. Started again at 3 p.m., following the creek down in a northerly direction. Good lagoons but country poor and sandy. Camped at 5 p.m. at the junction of two creeks with splendid pan dams; waterhole about 300 yards long and 30 yards broad. This watercourse we take to be the Ernest River. Distance travelled, 15 miles.

January 29th.—Started at 7 a.m., following the river (?) down, travelling N. River (really a fair sized creek) ran through a gorge to the E. Followed up a gully, and crossing over the ridge dropped over on to the Forrest River at a magnificent water-hole. This is probably Camera Pool. Saw a mob of blacks who swam the river and clambered up the cliffs on the other side. Could not get in communication with them as they fled on our approach. As the river ran through a gorge it was impossible to follow it down, so proceeded up stream for about two miles. Travelling very rough. Camped for dinner at 11 a.m. on a big water-hole. Started again at 3.30, crossed the river, and travelled N.E. over very rough hills for about one mile, then made E. Travelling very rough, country worthless. Camped at 5.30 p.m. in a gorge in the ranges. Distance travelled, 12 miles.

January 30th.—Rained during the night and showery this morning. Started at 7.45 a.m., travelled eight miles slightly N. of E. over rough stony hills. Men and horses heartily sick of stones, latter almost refuse to descend into ravines, their heels are so sore and bleeding. Struck the western branch of Patrick River and followed it down. Stones! stones! Travelling very rough. Country opened out and we camped on the edge of a very nice flat bordering on a big marsh formed by the tide from Forrest River. This is very nice country but apparently only a fringe round the marsh. After dinner Mr. Young and myself took a ride to the S.W. to try and locate the old Mission Station but could find no trace of it. Distance travelled, 10 miles.

January 31st.—Started at 6.40 a.m., travelled for one mile N., struck another branch of the Patrick River and had to follow it up into hills to cross. Then travelled N.N.E. over more stony hills to main branch of Patrick River. Struck a marsh and followed it round for five miles. Around the edge of this



Gorge which turned party back, February 18.



Crossing Duack River.



marsh is very nice country but of no extent. Camped on a sandy creek. Shot some ducks. Distance travelled, 10 miles.

February 1st.—Separation Camp. Arrangements had been made for a boat from Wyndham to meet us at the mouth of the Forrest River if we sent up smoke signals, so Mr. Young and myself, with a black boy and two pack-horses, proceeded E. leaving the rest of the party in camp to await our return. Entering a gap in the ranges we followed it up for about six miles when much to our astonishment we came upon an old road with cuttings in the sides of the hills and the stones cleared and the banks cut away at most of the creek crossings. We followed this road for about four miles to a fine pandanus spring on a big sandy flat, but lost it in the sandy country. At the spring we found cut on a boabab tree [R. PITT over 85].

This was evidently the road from Adolphus Island in Cambridge Gulf to the Victoria Squatting Co's. main camp on the Patrick River, as I understand this company had stock at both places. Crossing the sandy country we entered very rough gorgy country with a high range on our right covered with cypress pine. This we could not cross and it threw us a lot to the N.E. Following along the range we struck the marsh which came right to the foot of very precipitous hills and blocked our progress. Camped on a small pandanus soak in a small gorge. Ascended a high hill from the top of which we could see Wyndham plainly, and sent up a big smoke signal as arranged. Distance travelled, 20 miles.

February 2nd.—Tried to make south but could not get round hills for the marsh, so decided to tackle the range. Had terrible work getting horses up. One pack horse slipped and rolled completely over twice and cut herself frightfully. Had to move tons of stone to get her out. After five hours hard work we got everything to the top, but Mr. Young and myself were completely exhausted as we had no water. The black boy found some water in a rock hole and filled the water bag and brought it to us. Crossed another small spur and found a water hole and camped for dinner at 12.30. Started again at 3.30 and followed the gully down for two miles and camped. Climbed to the top of the hill and put up another smoke but could get no answering signal from Wyndham. Our horses were very lame and shoes coming off. Distance travelled, four miles.

February 3rd.—Shifted camp about two miles on to a nice grassy flat with a creek coming from N.W. Climbed the hill right at the mouth of Forrest River and kept a look-out for the boat all day. Put up a big smoke in the afternoon which must have been visible in Wyndham if people are on the look-out. Distance travelled, two miles.

February 4th.—Climbed the hill again this morning and kept a look-out for the boat till 11 a.m., and left in disgust, quite satisfied that the Wyndham people did not mean to trouble about us (we learned on our return that the boat had been over twice and the first time only missed us by two hours), and regretting the loss of five days of good weather and not receiving a further supply of rations, the latter a serious item, started at 2 p.m. on our return to Separation Camp. Followed up creek in a N.W. direction, keeping south of our outward route. Very rough travelling, horses very lame and shoes coming off. Camped in the ranges with cypress pine all around, some very nice timber. Distance travelled, seven miles.

February 5th.—Started 6.30 a.m. and mounted head of the creek. Hills very rough but covered with good pine timber. Followed down the gully,

heading for a marsh at the mouth of the Patrick River, the country becoming rougher and hills almost unsurmountable. Great trouble getting the horses along and the pack-horses' feet were bleeding terribly. It was great relief when we got out of the ranges and followed the marsh round to Separation Camp, reaching there about 12.30 p.m. Five days away during which we travelled some of the roughest country it is possible for horses to negotiate, and five days wasted. Distance travelled, 17 miles.

February 6th.—Separation Camp. Shod the horses that required shoeing. The black boys shot six ducks, which were a great treat and a change from the hard salt meat.

February 7th.—Started at 7.15 a.m., travelling N. up a branch of the Patrick River. Travelling as usual, very rough. Stones! Stones! Camped for dinner at 11.30 a.m. in the ranges after descending with great difficulty a very precipitous hill. More shoeing. Started at 3.30 p.m., still keeping a shade W. of N. Ascended a very rough gorge; one pack-horse fell and the saddle turned but no damage was done. This is the crest of the range, and the outlook ahead was much brighter. Cypress pine all along the top of the range. Descended into a creek running N., probably a branch of Lyne or Barton Rivers. Travelling much better. Camped at 5.30 p.m. on a nice flat with good water. Distance travelled, 14 miles.

February 8th.—Started at 7.15 a.m., following the creek in a N. direction. Good travelling by keeping on right hand side of the creek for about five miles, then crossed the creek in a big water hole. Here there is a dead gum tree standing in the water with H.S. cut on it (probably Harry Stockdale). Country opening out, sandy, but fair cattle country. Patches of pine all along. Camped for dinner at 10.45. Started again at 3.30, the valley widening out as we proceeded. The country was sandy with springs all along the side of the hills. This is rough cattle country well watered. Camped at 6 p.m. near a table-top mountain. General direction all day point E. of N. Mitchell shot a turkey. Distance travelled, 18 miles.

February 9th.—Started at 7 a.m., following the creek down in a northerly direction for about four miles, then the creek flowed W. Country still sandy with patches of pine. Camped for dinner at 10.15. Shod some horses. Started again at 3 p.m., but after going about two miles a heavy storm came up and we had to camp. Peculiar flat-topped hill S.W. of us. Mitchell shot another turkey which augmented our meat supply, then very low. Distance travelled, 12 miles.

February 10th.—Started at 6.50 a.m., following the creek down in a W. direction for about four miles, then it joined a big river coming from the S. and flowing away to the N. This is a fine stream and we regretted time would not permit of us following it down to determine what river it was, but from our position we were convinced it must be the Barton River, which flowed into the Drysdale River. Followed this river up for about two miles and crossed at the junction of a big creek coming from the S.W. There is a flat-topped hill between the two branches. Followed the S.W. branch up for two miles and camped for dinner at 11 a.m. Saw one blackfellow who made off as soon as he saw us. The black boys caught eight nice fish (black bream), which we enjoyed eating. Started at 3 p.m. and travelled W. over sandy country. Camped on a grassy flat under the foot of a range. Distance travelled, 12 miles.



Levering stones to make track.



Traveling down deep Gorge.



February 11th.—Started at 6.20 a.m., travelling W. up a small creek for about two hours, then struck into a gorge and followed it up for two miles, when the hills closed in and blocked us, and we had to return to the mouth of the gorge and camped for dinner at 11 a.m. Started at 2 p.m. and had a stiff climb up the hills to the N. and when on top made W. over level tableland for about three miles, then descended into a gully coming from N.W. and followed it up for two miles. All rough country with plenty of pine. Distance travelled, 12 miles.

February 12th.—Started at 6.20 a.m., keeping a S.W. course. Crossed a high tableland, then descended into a fine valley with a big creek coming from N.W. This valley is sandy but medium grazing covered with a fine forest of timber, messmate, bloodwood, and cypress pine. Later the country became very sandy, poor grazing but with fine timber. Crossed three gullies running N. Camped for dinner at 10.45 at the head of one of these gullies. Made good travelling this morning, about 13 miles. Started again at 2.15; had a slight shower, crossed the tableland, and descended into a creek running S.E.; followed it about eight miles. Fine water holes. Total distance travelled, 23 miles.

February 13th.—Started at 6.15 a.m., left the creek which made E. and travelled S.E.; crossed a fair sized creek running E. Ascended the range and struck tableland country, ironstone, gravel, and spinifex. Saw some iron-bark trees; first I have heard of in Kimberley. Good travelling, pack-horses making good pace. Camped for dinner at 11.15 in a rocky gorge with fine lilly holes. Started at 3.15 and travelled S. over rough tableland country for eight miles. Could not get water and travelled till dark, when a violent storm came up before we could get the tents pitched. Horses tearing shoes off every day. Distance travelled, 23 miles.

February 14th.—Started at 7.15 a.m., travelled south over very poor, rough country till 1 p.m. when we struck what we took to be the main branch of the Forrest River in a deep gorge. Crossed a big creek about three miles after starting in the morning. Country very rough and horses casting shoes every hour. Spent afternoon shoeing up. Boys caught some more fine fish (black bream). Had the last of our sugar and tea. Distance travelled, 10 miles.

February 15th.—Started at 6.20 a.m. and travelled south. Country still very rough and every creek is in a deep gorge which we have great difficulty in negotiating. Horses' heels very sore and grey mare, Dolly, bleeding terribly; although shod with leather, shoes being cast, and five horses had to be shod at dinner time. Camped for dinner at 11.30 on the bank of Durack River in a deep gorge. Started again at 2.40 and followed the Durack River up, travelling S.E. for two miles. Saw a mob of blacks. Camped at 5 p.m. in the bed of the Durack with high walls on both sides. We anticipate trouble getting out, as we want to make E. Distance travelled, 11 miles.

February 16th.—Started at 6.20 a.m. and followed the Durack River up for about a mile and after a stiff climb managed to get out. Travelled S. of E. over very rough country for about four miles, when we struck a very deep gorge. Had to shift stones and make a road down into it. Camped for dinner in the gorge at 10.30. Started again at 2.40 and had a great struggle to get out of the gorge. Travelled S. of E. over exceedingly rough country for 4½ hours. At dark made down into a very deep gorge and camped. Nearly all the horses have torn their shoes off. Distance travelled, 10 miles.

February 17th.—Started at 7 a.m. and had great difficulty getting out of the gorge. Made S. of E. Paek horse (Biddy) got leg jammed between two rocks crossing gully and fell. Had great work getting her up. Country very rough, deep gorges everywhere, and travelling very difficult. Camped at 11.30 on a fine spring in a small creek. Number of horses had to be shod. Started again at 3.20 and travelled till 6.30 over very rough country, and camped in a valley with a big creek and high walls on both sides. Violent storm came up just as we were pitching camp. Distance travelled, eight miles.

February 18th.—Started at 7.10 a.m. and after a stiff climb got on to a tableland, had not travelled far when we were blocked by gorges. Made south and got down into a gorge and followed it to its junction with the creek we camped on last night, then followed the creek, travelling N. Travelling very rough and shoes being cast and no more nails to shoe with. Camped for dinner at 11 a.m. Started again at 2.30 and got out of the gorge on to the hills. After travelling two miles came on to a gully where the chestnut horse died (No. 3 camp); then got on to sandy country. Great rejoicing to get away from the stones. Shot a native-companion and made a stew, which was a change from the damper and treacle we had been living on for the past four days. Distance travelled, 12 miles.

February 19th.—Started at 6.30 and travelled parallel with the route by which we came out. Camped for dinner at 12 noon on the bank of Penticost River. Mitchell shot a kangaroo and we cooked some steak. Started again at 3.30 and followed the Penticost up for about four miles and crossed at the head of the tide water. Travelled round the west side of Mt. Cockburn and camped on a small spring. Distance travelled, 21 miles.

February 20th.—Started at 7 a.m. and travelled N. over very stony country with some nice grassy ridges. Camped for dinner at 12 noon. Started again at 4 p.m. and still hugging Mt. Cockburn, crossed some very nice country with good flats on the edge of a marsh. Camped on a creek with fine water holes and good flat. Mitchell shot five ducks. Distance travelled, 16 miles.

February 21st.—Started at 7 a.m. and travelled about E. over some nice ridges and flats. Country slightly boggy owing to rain early this morning. Struck King River and followed it up to the head of tidal water. Camped for dinner at 11.15 on fine water hole. Started at 2.15, crossed King River, and travelled E. for two miles, then turned N. over very rough hills. Heavy storm caught us and rained for about two hours. Camped at dark in very rough gorge with no feed for horses. Left brown mare (Madam) behind, knocked up. Distance travelled, 20 miles.

February 22nd.—Reached Wyndham. Distance travelled, 18 miles.



Horses descending after making track.



Rough travelling.

FRUIT-DRYING FOR BEGINNERS.

PART II.

By GEO. QUINN, Horticultural Instructor.

(Reprinted from *The Journal of Agriculture of S.A.*, February, 1908.)

ZANTE CURRANTS.

The currant is the simplest of all fruits to dry, having small berries with comparatively thin skins. The berries should reach a rich, dark colour and sweet flavour before being gathered. To secure this result it is sometimes necessary to remove some of the leaves of the vines, to admit sunlight to the bunches hanging amidst dense foliage. This should not be done until the berries are purpling, or failure to form sugar may result. The sample of dried fruit, with many reddish specimens, is classed inferior, lacking both appearance and flavour. The bunches of currants are spread directly from the picking-vessels on to the trays, no dipping being deemed necessary. The fruit should not be piled upon the tray, but the whole of the floor space should be covered. If thick-shouldered bunches are prevalent, they should be parted out, to avoid dense masses of berries piling upon each other. After a couple of days' exposure to a moderate summer temperature, the fruit may be turned, if it is not drying rapidly. This is done by starting at the end of a row of trays, and placing an empty one upside down over the fruit on the first tray. Gripping both top and bottom trays firmly in the hands, the clamped trays are swiftly turned over, thus reversing their positions, and leaving the fruit upon the erstwhile empty tray. The lower and less-dried portion of the fruit is thus exposed to the sun, and the dried portion shaded. In hot, sunny weather it is sometimes possible, after two or three days' exposure, to merely stack the trays and permit the drying to complete itself in the stack. Whatever method is adopted, the fruit should not be overdried. Stacking may be done to complete the drying when the berries have reached the stage when no watery fluid will exude if they are rolled in the hands. When the fruit is taken up, and while the stalks are still brittle, it should be passed through the stemmer and grader—a couple of fine-meshed hand-sieves will suffice for a small quantity—to rub off and blow out the dry stalks and grade out the excessively-small or prematurely-dried currants, as well as the large seed-bearing berries, which spoil the sample. When cleaned and graded the fruit may be put up in bulk to "sweat," which is the technical term for the process of moisture-transfusion whereby the berries which are overdried absorb the surplus moisture from those somewhat underdried, thus making even the moistness of the bulk. These fruits are exceedingly liable to become infested with the larvæ of a fruit-moth, consequently they should be exposed as little as possible at night, and no time must be lost in tying them up securely in

strong, closely-woven calico-bags, which have been proved to be the cheapest effective coverings against this pest.

MUSCATEL OR TABLE RAISINS.

These are popularly known as "London Layers," but this name only applies to the method of packing the fruit in layers when dried. These are made from the Gordo Blanco and White Muscat of Alexandria grapes. Only fruit possessing the very highest qualities in flavour and size are suitable for this type of product. In consequence a very small proportion of the bunches in any crop will be found suitable for drying into table fruit. The fruit should be perfectly ripe, thin-skinned, and sugary. It should be cut in bright, sunny weather, when the skin is quite dry. Men of European experience advocate cutting the bunch with a thin shield of bark from the parent cane adhering to the stalk. As all the handling to be done with this fruit must be by holding the bunches by the stalks, there is an obvious advantage in this advice. The bunch as soon as cut is trimmed of inferior and damaged berries with scissors. It is then laid best side down upon the tray, which, for this fruit, is always carried into the vineyard. If the bunch is dense at the shoulder, the branchlets forming this portion are opened out to the sun. The bunches are placed with the shoulder-ends all facing towards one end of the tray, and when the surface is thus covered with a single layer of fruit the opposite end of the tray is tilted up a few inches towards the sun by placing a stone or clod beneath each southern corner. As the stalks and grapes wilt this tends to further open to the sunlight the more densely-grown ends of the bunches. A temperature not exceeding 96 degrees F. in the shade is considered most suitable. As the retention of the colour and bloom upon the fruit is of considerable importance, no dew or rain should reach the berries. Consequently, on most nights they need the cover afforded by stacking the trays or other more fixed and comprehensive sheltering devices such as have been referred to. These covers should remain over the fruit for several hours after sunrise. Should rain fall, abundance of air must pass around the covered fruit, or it will rapidly deteriorate and darken. To facilitate drying operations, the trays may be carried from the vineyard to a permanent drying ground. This, however, can only be done with perfect safety to its good appearance when the fruit has wilted somewhat and become flaccid. The best Spanish table raisins, it is said, are never turned during the drying process; but here they are usually turned after a week's exposure. When the bunches are nearly dry they are sorted into grades. When the berries no longer exude watery fluids if rolled between the fingers, the fruit should be lifted when quite warm and placed carefully in boxes or heaps of about 25lbs. each. After a few days the moisture is distributed throughout and the stalks toughened; the bunches are then ready for packing, but before being placed in the boxes each one is held up by the stalk, and any faulty or damaged berries or small twigs devoid of berries are cut out with the scissors. The central stalk, however, is not reduced, as it is of great value in binding the bunches into layers. This fruit is usually packed in shallow, tastefully paper-lined boxes, holding 5lbs. of fruit. The drying and preparation of this class of fruit demand more care and skill than most people are prepared to give to it, hence the attempts to put up table raisins in Australia have not resulted in the production of a very high-class article. It will be noticed that this

fruit is not dipped in any solution, neither is it handled other than by the stalk, and, further, the best qualities are always sun-dried.

LOOSE RAISINS OR LENIAS.

In Australia these are made from the fruits of the Gordo Blanco Muscat chiefly. It is true a small quantity is made from Waltham Cross, Muscat of Alexandria, and a grape locally known as Malaga, which closely resembles the Waltham Cross. Other solid-fleshed kinds are sometimes dried for private use, but the product is very inferior. The fruit should be perfectly ripe, crackling when bitten, and full of sugar before being harvested. They are dipped in a hot solution of lye made by dissolving 1lb. of caustic soda in each ten gallons of water. The fruits are immersed by dipping the baskets beneath the hot lye for about from four to six seconds, giving the basket a plunging and swirling motion to ensure wetting all of its contents. The lye appears to give best results if not hotter than 200 deg. F., and it should not fall below 190 deg. F. The fruit is turned out of the dipping-basket on to the tray that rests upon the sloping draining-table, which allows the surplus lye-water to flow back into the dipping-bath. If properly dipped, the skins of the fruits should turn to a rich brown tint almost as soon as the extraneous water evaporates from their surfaces. After being partially dried the fruit should be turned in the usual way, and when no ordinary water fluid exudes under the usual finger test the fruits should be taken up. If lifted during the early afternoon of a sunny day the stalks will be dry and brittle, and may be more readily removed by the grading-machine, or in small quantities by being rubbed over sieves. The fruits, when taken up, are kept separate, according to their colour, those of a lighter-brown tint being classed as "goldens," and the darker as "browns." These divisions are graded into different sizes by being passed through the sieves of the grading-machine. The "sweating" process may then be allowed to proceed, until the fruit is boxed or bagged up. Care should be taken to exclude moths as much as possible while this is in progress, or much waste must inevitably arise from the depredations of the larvæ of these pests.

SULTANAS.

A recognised authority on this fruit states very truly that it should not be cut from the vine for nearly a fortnight after the berries are palatably sweet. The skin should be rich amber in colour, and unless much exposed this lengthened period of attachment to the vine causes the skin to become finer. The freshly-cut fruit should be dipped without delay into the bath, which is made up to the strength of about 12 gallons of water to each pound of caustic soda, and kept at a temperature of from 175 to 190 deg. F. The dipping should occupy about four seconds, during which period the operator has just time to give the dipping-basket a plunging swirl beneath the hot solution. To keep the dipping-solution constant at strength, a simple chemical test may be used. This consists of finding out by actual trial how much acid (Hydrochloric will be best) is required to neutralize a given volume of the standard dip made up to the strength used when it is freshly prepared. Litmus-paper or solution may be used to indicate the reaction. After a few trials a rule-of-thumb method of adding so much soda to the refilled dipping bath from time to time, after certain quantities of fruit have been

immersed, may be safely adopted. This method has found favour with some of our largest sultana-growers.

As far as practicable, the fruit should only be cut when dry, and rough handling must be avoided, or split berries and consequent loss of sugar, with attendant discoloration and stickiness, must inevitably result.

After dipping, the fruit must be spread thinly upon the tray, taking care to spread the shoulders, so characteristic of the bunches of this variety. This may be done by handling, or by cutting the stalks asunder. Unless the nights are very dry, dipping should cease early in the afternoon, as all extraneous water should dry off the fruit before sunset. To obtain the best colour and plump fleshiness in the dried product, the drying process should never cease, consequently the trays should be effectively covered or stacked against dew or rain, and provision made for a constant draught of air between every tray in the stack, if cool weather supervenes. The Sultanas should be turned a day or so after dipping, quite irrespective of being sufficiently dried on the upper side. To make the finest product excessive sun-heat should be avoided, and on unusually hot days, such as come with our so-called heat waves, the trays should be stacked, and the topmost covered with an empty tray. The Sultana when sufficiently dry for lifting from the trays, is somewhat sticky, as pliable as fresh meat to the touch, and the pulp has an appearance bordering upon that of thick jelly. When lifting, sort out discoloured fruits and damaged bunches, put through the stemmer and grader without delay, or toughness will result, and these processes be made difficult. Sweating may take place afterwards, before packing for market.

APPLES.

Almost any white-fleshed apple of good, sweet flavour will make a decent dried product, if properly manipulated, such varieties as White Moss, Mobb's Royal, Lord Suffield, Cleopatra, etc., being favoured. The fruits should be thoroughly mature, though not "mealy." They are peeled and cored by one machine, and sliced into rings by another. Many peeling and coring-machines are used, but those which can be driven by belting turned by machinery shafting are best for commercial purposes. Some have one apple-holder, others two, and others three. These machines are tolerably durable when kept in good repair and free from corrosion due to the acid juices of the fruits.

No time must be lost in slicing the peeled and cored apples, and as soon as they are sliced they should be spread out thinly on the trays and subjected to sulphur fumes for half-an-hour to fix the colour. It is imperative that no delay occurs, or the freshly-cut surfaces of this fruit discolour with extreme rapidity. If delay be unavoidable, put the peeled apples into very weak brine until ready for slicing. Apples are never sun-dried here for commercial purposes; evaporators are essential. In a good evaporator, where a temperature of from 140 to 160 deg F. can be kept up, accompanied by a good draught of air, the thin slices may be dried in eight or ten hours. When pliable, and somewhat sticky to the touch, the fruit is dry enough, and should be put to sweat, where it will be safe from the attacks of moths. Small lots of apples for home consumption may be peeled, cored, and sliced by a cheap hand-machine, and instead of sulphuring may be kept tolerably white by being immersed in a weak brine until the quantity required to fill the trays is ready.

PEARS.

For drying purposes the Williams' Bon Chretien, or the locally so-called "Duchess" pear, has found most favour. One of our most capable driers favours Flemish Beauty also. When ready to be operated upon the fruits must be of medium size, quite matured, but firm. Some driers leave the skin, core, and stalks upon the halved fruits. The best product, however, results from removing the peel as well as the core and stalk of the pear. When thus prepared, the halves are spread upon trays in a single layer, with the cut side upwards, and are subjected to sulphur fumes for a period varying from eight to sixteen hours, according to the ripeness of the fruit. They are then spread out in the sun, or placed in the evaporator. Unlike the apple, a good product is secured by sun-drying the pear. This fruit should never be subject to extremely high temperatures, neither should the drying process be arrested, hence the value of some sort of an evaporator to finish off the fruit should damp or cool weather be experienced when it is half dried.

The flesh of the fruit when it is ready to lift should be plastic and somewhat sticky, and it should be possible when the sweating has been completed to roll each piece up like putty without any juice or jellylike substance being expressed from it.

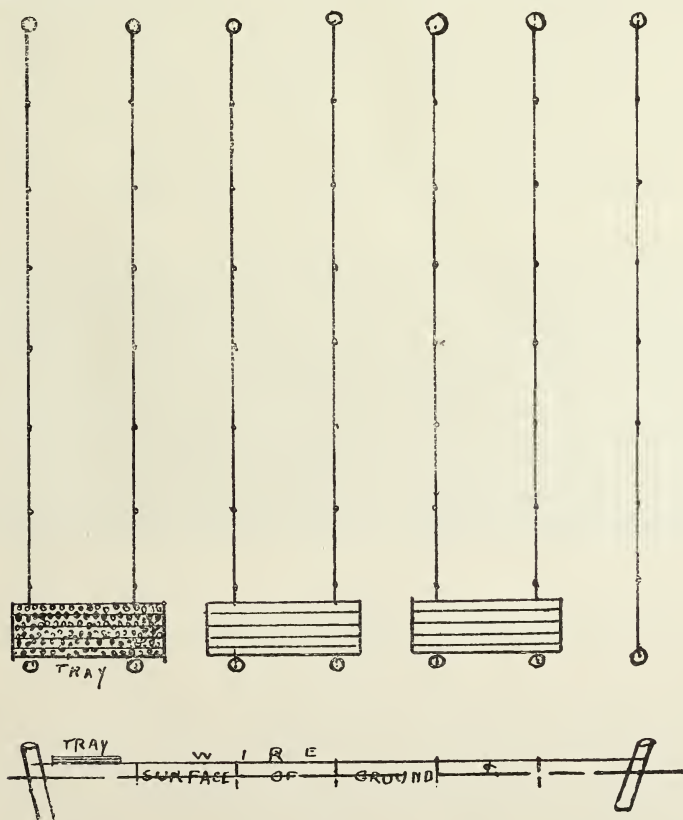


Fig. 12.

Plan and section of Wire-tray Supports.

DRYING-GROUNDS AND SHELTERS.

In the previous article reference was made to the positions found most suitable on which to spread the trays containing the fruit. I now wish to refer to the simple and cheap method of raising them above the ground level, illustrated in Fig 12. This consists of parallel lines of fencing-wires stretched tightly along about six inches above the ground, and kept in position by being fastened to pegs driven firmly into the soil. The end posts are stouter, and act as strainers. The distance between the wires is such that the trays, when resting upon them, reach across, just leaving a walking space between each row. It is claimed that by this method the trays are freer from dust, and in case of sudden rain-showers the running water passes beneath the trays, leaving the fruits untouched. In Fig. 13 a very effective cover, as used by Mr. C. Hoffman, of Nuriootpa, to protect the trays of fruit against rain, dew, or excessive sun-heat, is shown. It is made by fastening galvanised iron upon a framework upon which wheels are fixed, and so that they run upon a light iron tramway. This cover is raised about two feet above the ground, and is made in sections. A couple of men can at a moment's notice push it section by section all over the outspread trays. The tramrails extend sufficiently beyond the area devoted to the trays to allow the whole of the covers remaining in readiness for emergencies. Owing to the power the wind exercises when passing beneath such a spread of roofing, a locking-catch is necessary, which grips around the rail when the frame is stationary. Such a cover is of considerable value in localities subject to sudden changes of weather, as much stacking of trays is obviated by its use, more especially if they be raised off the ground by being spread upon wires, as described above. Our illustration shows them resting upon sawn rails laid upon the ground.

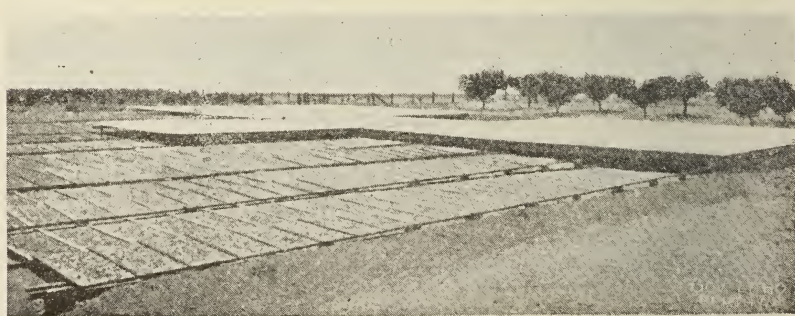


Fig. 13.

Low roofing of galvanized iron running in sections upon wheels. Drying-trays resting upon small planks instead of upon the ground.

FRUIT EVAPORATORS.

Reference has been made in these notes to evaporating by fire-heat, and the types of evaporators in use are now briefly outlined. Although there are many modifications of these types, each doubtless possessing certain advantages which have some special appropriateness under the circumstances surrounding it, they are only modifications. The three types are:—

- (1) The horizontal, or kiln;
- (2) The sloping or oblique;
- (3) The vertical or upright form.

The horizontal kiln is probably the crudest form. As shown in Fig. 14, it consists of a structure, usually oblong in shape, of any length, but of sufficient width to allow a row of trays to be stacked along each side, and an alley-way or walking-space down the centre. A door at each end, but on opposite sides, affords means of admission or exit. Some, however, are made wide enough to permit a central row of trays being staged, with the walking-space on each side of this row, but still inside of the outer rows of trays. These tray-racks may consist of either iron staging or iron spikes driven or built into the side walls. The trays do not rest upon each other, several inches

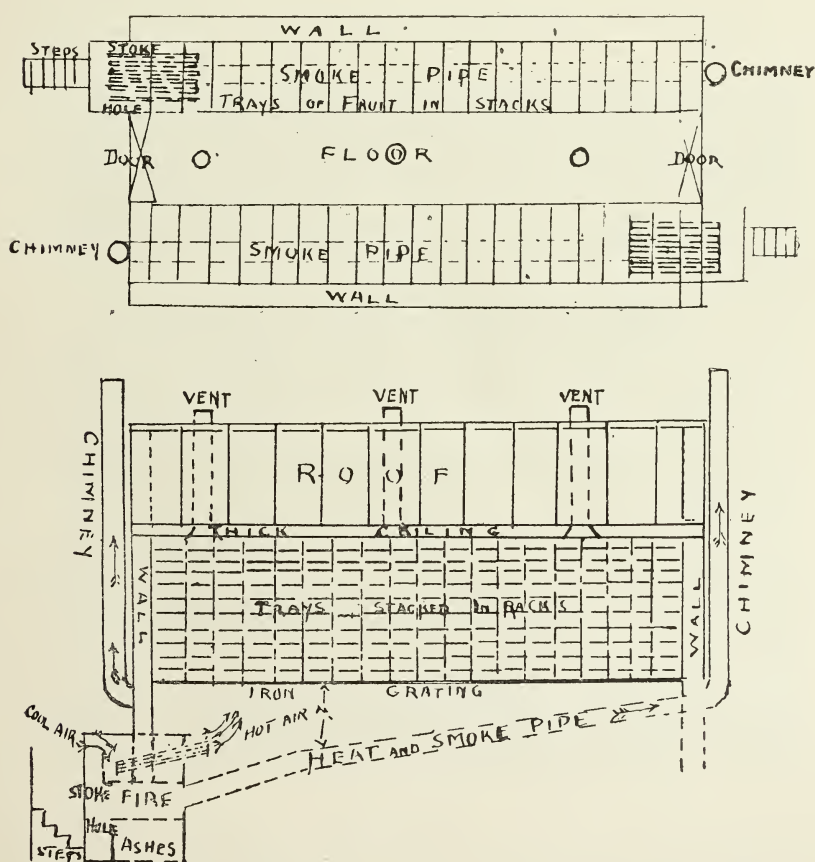


Fig. 14.

Vertical section and ground-plan of Horizontal Drying-kiln.

of space intervening between each layer of trays. The lowest of these stages or racks should be from $1\frac{1}{2}$ to 2 feet above the floor. The heat is supplied by furnaces built in stokeholes being excavated at each end of the building, but on opposite sides to each other. The crude method was to make a fine

which came direct from the fire pass along beneath the tray-racks, and find its exit in a chimney at the opposite end, but outside the kiln. The heat, smoke, and other unconsumed products of combustion thus passed beneath the building to the chimney, and only such heat as was thrown off the upper face of the flue or pipe in its rapid passage entered the kiln. This left a dead, dank, moisture-laden atmosphere inside the structure. Sometimes the flues were constructed of bricks, at other times of iron pipes six to nine inches in diameter, whilst a third consisted of large glazed earthenware pipes securely jointed into each other. It is hard to say which of the two latter is the better; some favour the iron, others the clay pipes. Besides this pipe or flue, a more modern kiln has pipes about four inches in diameter built into the roof of the furnace, with the ends for the admission of the fresh air projecting into the stokehole, and the other ends opening into the interior of the kiln. These pipes slope upwards in to the kiln. Thus cool air is drawn into the pipes as fast as the fire in the furnace heats and passes it into the drying-kiln. Other vents, which may be regulated with sliding shields, should be provided in the walls or roof to allow the hot but moisture-laden air to pass away. There can be no doubt that the secret of successful work in fruit-evaporation by fire heat lies in obtaining a constant draught through the room

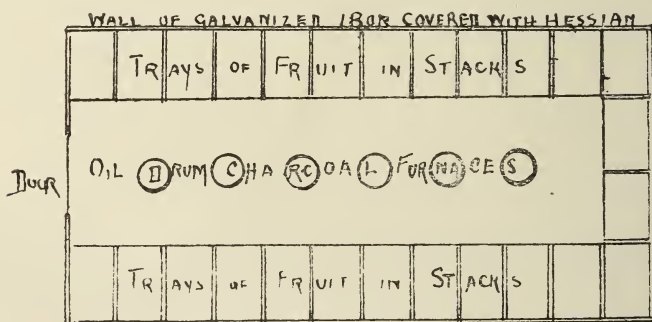


Fig. 15.

Extemporized Kiln as used at Renmark. The walls were made of galvanized iron or empty drying-trays placed on edge. These were then covered with hessian or bagging.

or machine. A very high degree of heat is not desirable, but the warmth must be constant and the draught unfailing, otherwise the moisture is driven out of the fruit into the confined atmosphere until it becomes supersaturated. The fruit is then either grilled or roasted, just in accordance with the heat supplied. A temperature like that experienced in the open on a bright sunny summer's day—and if accompanied with a little breeze from the warmer quarter all the better—is the ideal to be aimed at. If one could regulate the temperature under such conditions so as to range between 130 and 160 deg F., most excellent results must follow in the drying of most kinds of fruits. Extemporised kilns on the lines indicated in Fig. 15 were rapidly put together

by several Renmark fruitgrowers a season or two ago, when the temperatures were constantly low and the atmosphere humid. These consisted, roughly, of galvanised iron sheds made a little more air-tight by the use of hessian and other materials. In these the trays containing the partially-dried raisins were stacked in rows one upon the other, to a considerable height, an empty tray or two being placed on the bottom. Along the alleyways iron drums were placed containing burning charcoal, which supplied the heat. The results were very gratifying, though perhaps not what could be achieved with more exact appliances. It is possible the porous character of the building materials, though wasteful of heat, permitted the necessary admission of fresh air, and the escape of that charged with the moisture of the fruit.

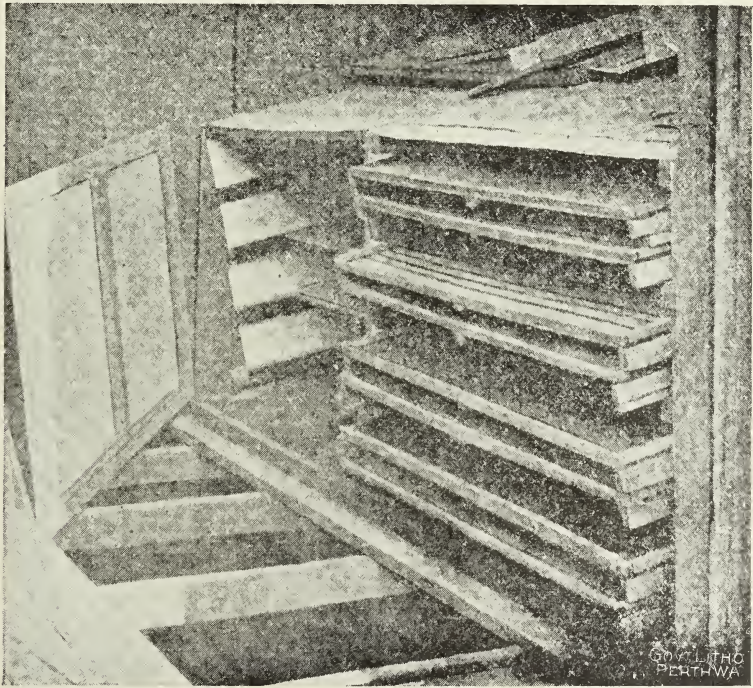


Fig. 16.

Lower end of Sloping Evaporator, showing trays in sloping racks in one division. A door is seen on the left. The furnace is located in the cavity beneath.

THE SLOPING EVAPORATOR.

This, like the kiln, should be constructed so that the trays used in outdoor drying fit the racks, or slides. By adopting this precaution advantage may be taken of sun-drying on hot days, and continuing the evaporation of moisture at night, or by day should damp or cool changes occur. This type of evaporator is made so that the trays of fruit slide on slotted runners, or small

lower end, although the finishing touch to the drying process usually calls for the highest temperature allowable.

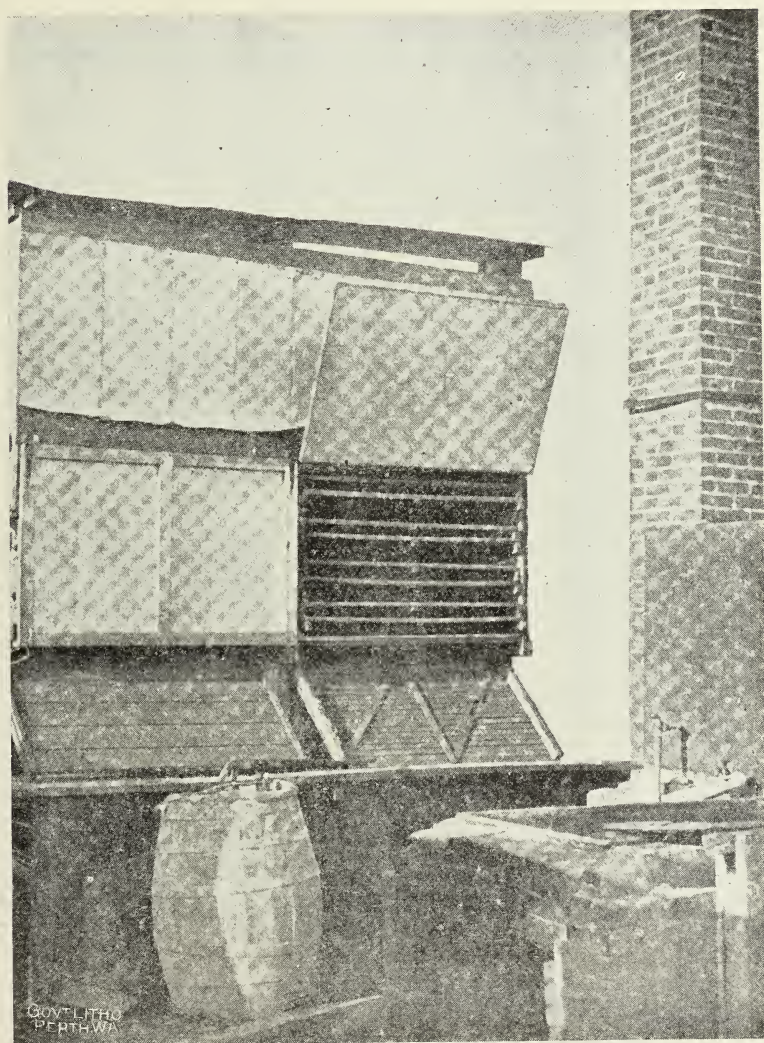


Fig. 18.

*Upper end of Sloping Evaporator, where trays are withdrawn or changed.
Spray pump and Dipping-tank in foreground.*

THE VERTICAL EVAPORATOR.

This is the kind of drying-apparatus usually adopted by those who dry by artificial means solely. It must also necessarily be so, as the types of wire-meshed trays used are generally quite unsuited to outdoor use. This evapora-

tor may consist of a column of trays, as seen in Fig. 19, each resting upon that one immediately beneath it. The sides of the trays thus form in them-



Fig. 19.

Front view of Vertical Evaporator, with empty trays alongside.

selves an upright flue through which the heat must ascend. In passing through the pile of trays it carries off the moisture from the fruit. The fire is contained in a furnace which is usually placed in an excavation dug directly beneath the position where the trays will rest. An enclosing jacket directs the heat from the top of the furnace into the column of trays above, whilst the soot and smoke ascend outside of the tray column through a chimney which is continued on from the back of the firehole. Some forms of vertical evaporators have the tray-column enclosed in a square framework, which doubtless confines and economises heat. These machines have various devices by which the trays are elevated. The most common form is a side lever by

which an endless-chain attachment is worked, lifting the trays in a body at each pressing sufficiently to enable another to be inserted at the bottom. In those possessing the enclosing framework two small projecting iron pegs are attached to each side of the framework to support each tray. These lift to a vertical position, when pushed from beneath by the ascending tray, and automatically fall back to a horizontal position when the tray has passed upwards. Those with the naked column of trays have a footlike clip at the bottom, which lifts somewhat similarly under pressure, thus raising the lowest tray and falling back into place again when another has been inserted. This form of evaporator, like all the preceding types, fails to a certain extent in its efforts to get rid of the heavy moisture-laden air, consequently it has a tendency to settle downwards as the temperature of the fruit falls and semi-stew the product. The person who can devise a cheap and effective means of forcing the air out from amongst the trays before it becomes too heavily charged with moisture, and yet not be over-wasteful of heat, will cause a great improvement to take place in the quality of evaporated fruits, and vastly facilitate the operation of drying orchard and garden produce.

CORRESPONDENCE.

IMPACTION OF COW'S STOMACH.

The Editor the Agricultural Journal.

On page 319 of the April issue of the *Journal* there is a copy of a letter sent to us by Mr. J. L. Burns, V.S., in reply to some questions which we asked him, but it appears to us that the "symptoms during life and the result of the post-mortem" should have been given as well, so as to make the matter clear and to be of use to anyone else.

The symptoms, etc., were as follows:—"Found the cow on Saturday afternoon, the 13th February (had not seen her since the morning of the 11th). She had evidently been down a day or two before we found her, as a place was found amongst some reeds where she had been struggling, and some dung was lying about. She could rise on her fore-legs, but perfectly paralysed in hind-quarters (not like any wobbles seen before). Frequently tried to get up, but without success; should say she was in pain, at least part of the time, as she struggled and threw herself about a good deal. She shifted her position at times, dragging herself on her belly with her hind-legs trailing behind her. She drank well but ate very little. Dosed her with bran mash and salt, and each morning drenched her with tabloids supplied by the Department, or about 20grs. pot. permang. She got weaker every day and died in six days from time we found her. She was dead on Saturday morning, the 20th, when we went up to attend to her, and quite cold; probably died some time in the night. After death we opened her. All internal organs seemed healthy. *Stomach* full of undigested food, very dry, hardly any moisture at all; the *bible* packed with dry food. Could see no signs of any palms in the stomach. The chaff

and maize we had fed her on was just as she had eaten it, only a little damp. The *intestines* were nearly empty, and in some parts looked quite pink. She had a piece of leather strap about a foot long and 1½ inches wide in her paunch, but there was no metal whatever attached to it.

“Query. If she had eaten palms or the nuts therefrom, would not there be some indication of same in the stomach? as she could not have digested same in the time, considering that the food was undigested. She was about half gone in calf.”

From the above you will see that we thought it was a case of “wobbles,” and treated it as such; and it was to decide this question that we wrote to Mr. Burns. The treatment advised by Mr. Burns is undoubtedly on the right track because we had a young heifer down, showing exactly the same symptoms, but we fortunately found her in time and dosed her with linseed and croton oil. As a result she was walking about again as good as ever after three days. In this case, as it was only a small beast, we ent the croton oil down to seven drops.—Yours etc.,

SHELLEY & BROWN,

Beenup (S.W. Railway), 15th May, 1909.

The Chief Inspector of Stock, Mr. R. E. Weir, adds that it is evident from the symptoms and post-mortem appearance the trouble was due to impaction, and the treatment prescribed would be efficient for the case.

NATIVE WATTLE AND GALLS.

Mr. W. E. Ash, of “Ontario,” Harvey, writes under date 12th May:—

“I am sending you some specimens of galls from the native wattle (the largest broad-leaved species of this district). This “gall” has greatly increased during later years and seems to finally destroy all of them. I would like to have this insect identified.

You will also find a weevil infesting the “galls.” I have found a caterpillar in the galls which I thought was the larvæ of the weevil; but I do not know this weevil and hope you can identify it and let me know if you think it possible for it to turn its attention to our nuts or seeds?”

Replying to the above, the Under Secretary states that “the galls are caused by the larvæ of the wood-boring moth, which attacks the acacias or wattles very much, disfiguring and eventually killing the tree. The larvæ found by you is the maggot of the moth, and not as you supposed, of the weevil. The weevil is also a native species, and is frequently found attacking the dead and dying parts of trees and plants. It is quite possible for any of the native insects to adapt themselves to the cultivated plants. For instance, in Victoria, a moth closely related to the one affecting the acacias in this State, has developed a liking for the apple, and has become a very serious pest there. It is known as the curved-winged apple moth. When an insect does this it is usually due to the cutting out of its native food.”

SPROUTED SEED POTATOES.

From tests made by the Queensland Agricultural College, it has been conclusively proved that seed potatoes which have been sprouted before planting have come up more evenly and have given better returns than seeds which had not sprouted before. In Ireland also many trials have recently been carried out in respect to potato-growing in many of the counties, and the results confirm the advantages to be gained by sprouting potatoes before sowing. In the tests made in Ireland the potatoes sprouted in boxes, being for the main crop of late varieties, there was an average increase in the yields of two tons per acre from sprouting, and in every county the average showed more or less of an increase. During several seasons the increase due to sprouting ranged from $1\frac{1}{2}$ to $2\frac{1}{2}$ tons per acre. This is strong testimony in favour of the slight extra trouble of sprouting potatoes before sowing them (says the *Otago Witness*), and farmers should bear this in mind when the potato-planting season again comes round.

POULTRY NOTES.

By FRANK H. ROBERTSON.

THE COLONY SYSTEM.

The keeping of fowls on the "colony" system is a method frequently advocated, but seldom met with in actual practice in this State, although much in vogue both in England and America.

A practical illustration of this method may be seen at the poultry farm run by Mr. G. C. Clements at Armadale. The farm is situated on rather low-lying land about a mile from the railway station in the direction of the line to Jandakot. At first sight one would consider the spot a most unsuitable one for successful poultry-raising owing to the land having been quite cleared of all growing timber, and consequently entirely devoid of the natural tree shelter so much desired for shade from the sun; neither is there any undergrowth for protection against bleak winds in cold weather; yet notwithstanding these deficiencies all the birds were in perfect condition; in fact, one could not wish to see a more healthy-looking lot of birds. Their bright red combs, sturdy limbs, and general activity betokened complete satisfaction with the

existing conditions, combined, of course, with good feeding, of which I will make mention later on.

At the time of my visit, early in May, the stock consisted of nearly all White Leghorns; there were a few cross White Leghorn and White Wyandottes among them. Mr. Clements likes these birds very well, as they mature quickly, and are good layers, but he finds them very heavy eaters; there is also the objection of having to keep two pure breeds to produce the desired first cross, so that, taking everything into consideration, attention will in future be paid to nothing but pure White Leghorns. The stock consists of about 725 birds—570 pullets, 150 hens, and only 5 cockerels, these last-named being birds bought from Mr. S. Craig for breeding from during the coming season. All cockerels bred on the farm have been disposed of for table purposes. The stock are of a good useful type, possessing more substance than many of our present flocks of Leghorns; they have a good deal of Bunneman's and Bristow's strains in their composition.

The area of land available is 60 acres, but it is not all in use yet. The houses are large and very lofty, being 16ft. x 14ft., about 10ft. high in front facing the East, with roof sloping to the back. The first houses were built of split timber, covered with bagging, and iron roofs; but new houses are built of 6in. x 1in. jarrah planking, lined inside with bagging, which is removed during the summer months. Houses, numbering 14, are placed in two rows about 100 yards apart. There are three perches in each, suspended by wires. About 40 birds, and never more than 50, roost in each house. The floor is sand and raised six inches from the outside level. The nest-boxes are kept inside the houses. A large bagging shelter, open all round, is provided to each "colony" for shade from the sun, and for protection on cold, wet days the birds take to the fowl-houses, which are made extra large for this purpose.

This is not the orthodox system, as most poultry-keepers provide extra shelter outside of the roosting-house for protection against bad weather in the day time, but the fact of the houses being so large and lofty renders them suitable for both day and night use. There are no wire-netting runs as the birds have free range over a wide area of, say, 40 acres, and as there is a supply of Cape-weed growing all the year round, the combination of unlimited range and constant green stuff accounts for the excellent health and good egg-yield. Moreover the great expense of putting up separate runs is avoided, a great deal of labour is also saved in feeding. There is a roadway between the two rows of houses; a sulky is driven along this track and the food deposited on bags at certain spots which Mr. Clements terms the feeding-stations. The birds get to know the localities; the "colonies" mix up a little at feeding time, but this is rather an advantage as it provides exercise. At night time the members of each "colony" make for their own house. A good supply of meat is used which is found by purchasing old cows in the district at a low figure. Mr. Clements also has a few head grazing on the land, and they are slaughtered as required.

Mr. Clements has not been long at poultry-farming, but, judging from the appearance of his birds and the simple manner of running them, he is likely to make a good success out of the business.

SUBIACO EGG-LAYING COMPETITION.

Commenced May 1, 1909. To close April 30, 1910.

Following are the results up to May 31:—

The figures in black indicate the winners of the monthly prizes.

The first column of figures indicates the present position of the pens in the competition.

FOWLS.							May.
	Owner.				Breed.		
1	Greenville, P. F. .. ..	..	..	..	Silver Wyandotte	..	112
2	A. W. Green .. ..	..	..	..	White Leghorn	..	109
3	Mrs. A. Robinson (No. 1) .. ..	..	..	..	White Leghorn	..	107
4	Sunnyhurst Egg Farm (S.A.) .. ..	..	..	..	White Leghorn	..	107
5	D. Mildren (S.A.) .. ..	..	..	..	White Leghorn	..	106
6	Mrs. S. Dixon .. ..	..	..	..	White Leghorn	..	106
7	Cæsar and Geddes .. ..	..	..	..	White Leghorn	..	105
8	Mrs. M. Kynaston .. ..	..	..	..	White Leghorn	..	98
9	R. L. Martin .. ..	..	..	..	White Leghorn	..	94
10	J. E. Pryke .. ..	..	..	..	White Leghorn	..	93
11	Gwalia Pen .. ..	..	..	..	White Leghorn	..	93
12	Mrs. L. Mellen .. ..	..	..	..	White Leghorn	..	91
13	M. Love .. ..	..	..	..	White Leghorn	..	90
14	C. B. Bertelsmier (S.A.) .. ..	..	..	..	White Leghorn	..	90
15	South Perth P.F. .. ..	..	..	..	White Leghorn	..	89
16	Lionhurst, P. F. .. ..	..	..	..	White Leghorn	..	85
17	A. H. Padman (S.A.) .. ..	..	..	..	White Leghorn	..	83
18	Mrs. A. Robinson (No. 2) .. ..	..	..	..	White Leghorn	..	80
19	Bert. O'Shannassy .. ..	..	..	..	White Leghorn	..	79
20	E. E. Ranford .. ..	..	..	..	Black Orpington	..	76
21	J. Faulkner .. ..	..	..	..	White Leghorn	..	75
22	F. Whitfield .. ..	..	..	..	White Leghorn	..	75
23	Jack R. Parkes .. ..	..	..	..	White Leghorn	..	75
24	S. W. Stewart .. ..	..	..	..	White Leghorn	..	67
25	Craig Bros. .. ..	..	..	..	Black Orpington	..	67
26	Mrs. A. E. Kinnear (S.A.) .. ..	..	..	..	White Leghorn	..	66
27	A. L. Ballantyne .. ..	..	..	..	White Leghorn	..	66
28	Jack R. Parkes .. ..	..	..	..	White Leghorn	..	65
29	Stafford Bros. .. ..	..	..	..	White Leghorn	..	58
30	W. H. Wright .. ..	..	..	..	White Leghorn	..	58
31	Sunflower P. F. .. ..	..	..	..	White Leghorn	..	53
32	Wilson and Cæsar .. ..	..	..	..	White Leghorn	..	51
33	Greenville, P. F. .. ..	..	..	..	White Leghorn	..	47
34	Stephen Craig .. ..	..	..	..	White Leghorn	..	46
35	H. Hunter .. ..	..	..	..	Plymouth Rock	..	46
36	Austin and Thomas .. ..	..	..	..	White Leghorn	..	45
37	E. E. Ranford .. ..	..	..	..	Minorca ..	..	40
38	Belmont P. F. .. ..	..	..	..	White Leghorn	..	38
39	C. W. Johnson .. ..	..	..	..	White Leghorn	..	36
40	White Wings P. Y. .. ..	..	..	..	White Leghorn	..	33
41	Mrs. E. Douglas .. ..	..	..	..	Black Orpington	..	31
42	E. E. Ranford .. ..	..	..	..	Brown Leghorn	..	29
43	C. L. Braddock .. ..	..	..	..	White Leghorn	..	28
44	F. S. Squires .. ..	..	..	..	White Leghorn	..	20
45	J. Faulkner .. ..	..	..	..	Golden Wyandotte	..	16
46	Mrs. E. Small .. ..	..	..	..	British Game	..	15
47	Carlowrie P. F. .. ..	..	..	..	Brown Leghorn	..	12
48	White Wings P. F. .. ..	..	..	..	Black Orpington	..	7

3,158

Winner of first monthly prize, Greenville P. F., Silver Wyandottes, 112.

DUCKS.

	Owner.	Breed.	May.
1	P. Lyons	Indian Runner ..	159
2	Simplex Incubator Factory	White Indian Runner ..	114
3	G. Thomson	Indian Runner ..	106
4	White Wings P. F.	Indian Runner ..	103
5	H. Carr	Indian Runner ..	93
6	C. W. Johuson	Indian Runner ..	87
7	A. Pratt	Indian Runner ..	60
8	Carlowrie P. Y.	Indian Runner ..	59
9	White Wings P. F.	Buff Orpington ..	52
10	D. Vincent	Indian Runner ..	47
11	South Perth P. F.	Indian Runner ..	43
12	J. T. Johns	Indian Runner ..	30
13	Jack R. Parkes (No. 2)	Indian Runner ..	29
14	Greenville P. F.	Indian Runner ..	24
15	Jack R. Parkes (No. 1)	Indian Runner ..	14
16	Mrs. Ginder	Rouen ..	14
17	P. O'Connor	Indian Runner ..	9
18	F. Whitfield	Indian Runner ..	5
19	K. Becker	Indian Runner ..	4
20	Rowenhurst Pen	Indian Runner ..	3
21	Greenville P. F.	Pekin ..	2
22	Mrs. E. Small	Pekin ..	1
23	Mrs. Ginder	Aylesbury ..	0
24	Mrs. L. Mellen	Indian Runner ..	0
			1,058

Winner of first monthly prize, Mr. P. Lyons, Indian Runner, 159.

POTATO CULTIVATION AT GRASSMERE.

(Report by MR. D. L. BREEN, Inspector of Orchards.)

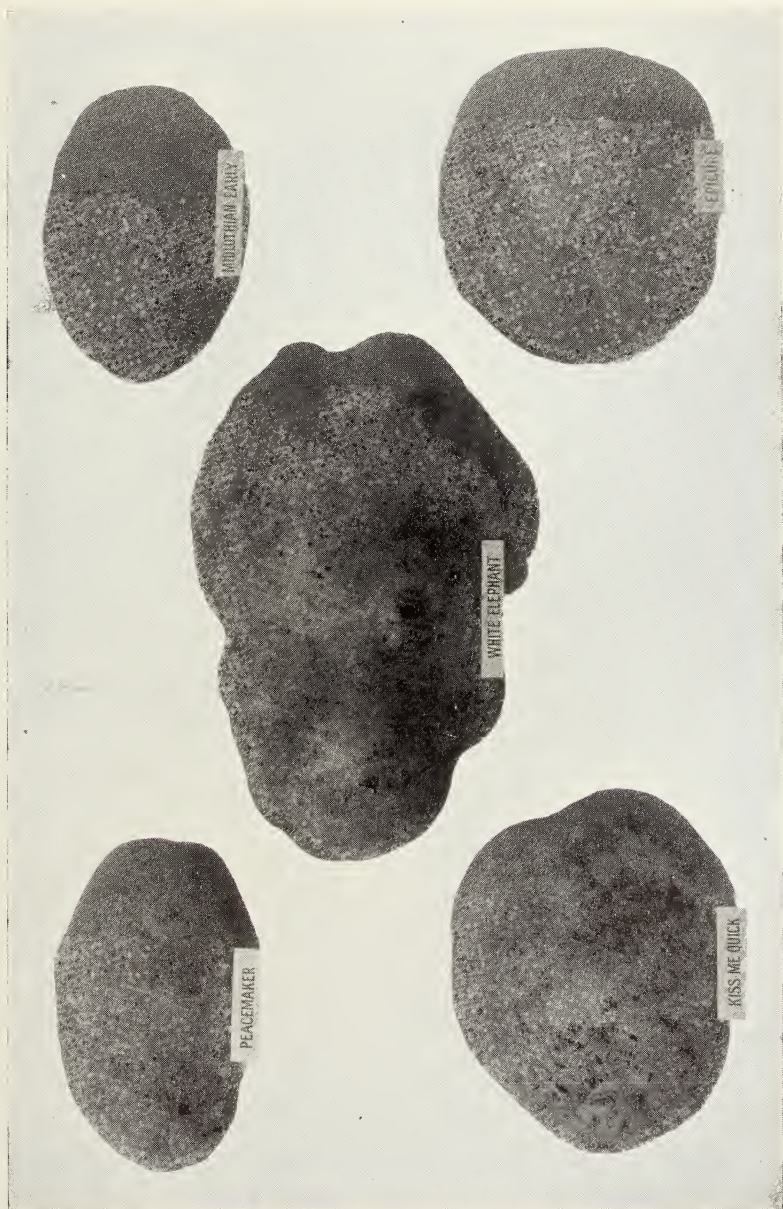
To the Chief Inspector.

By this day's (31st May) train I am forwarding to the Agricultural Department various samples of potatoes grown by Mr. J. Mowforth, of Grassmere, from imported seed. The name of each variety is enclosed in the package. Many of the samples are varieties new to the State, and I am appending a few notes as to their suitability for local growing and value from a commercial standpoint. The varieties are named in order of their value, according to the owner's estimate.

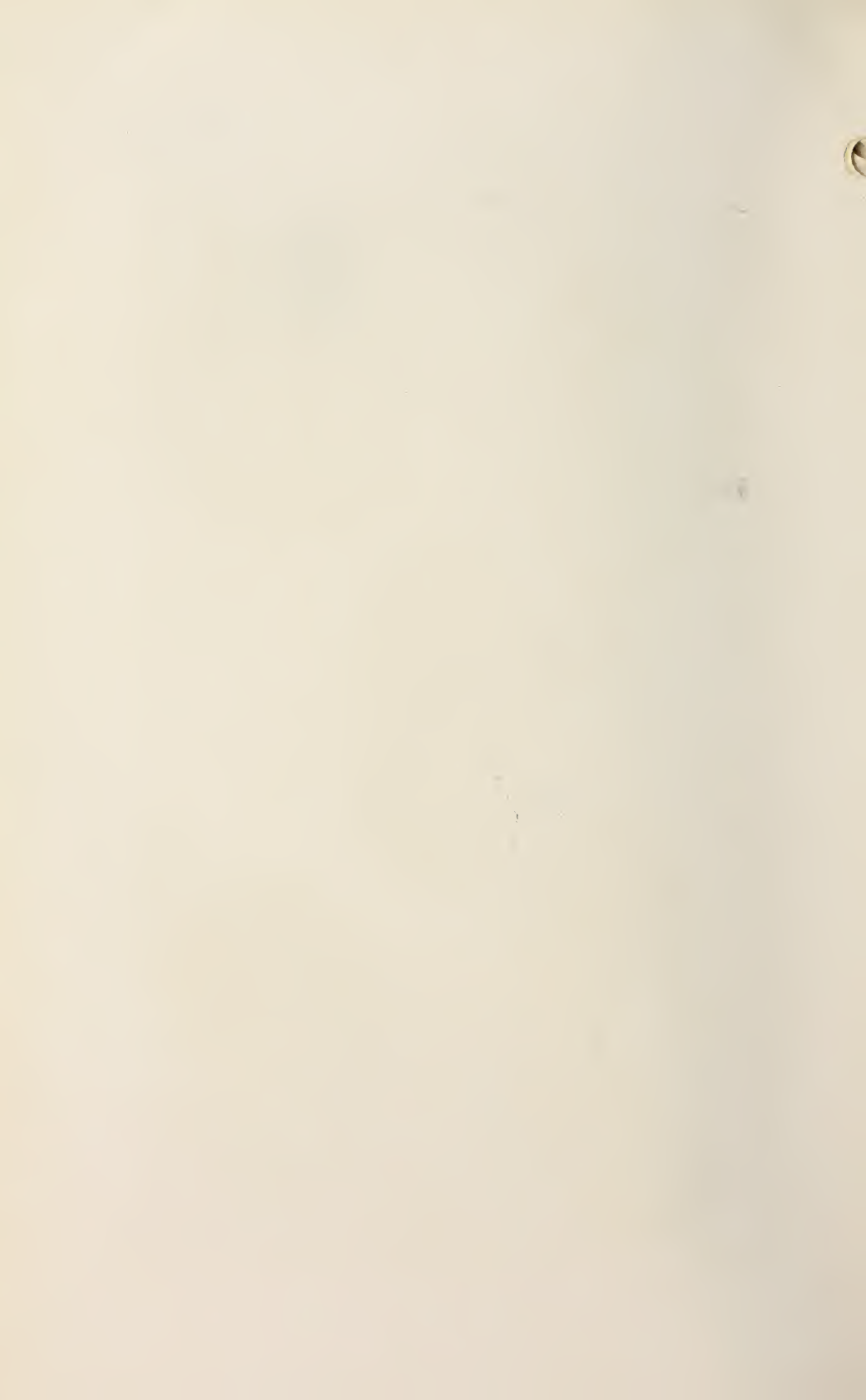
The seed was obtained from three distinct sources, and has been grown under similar conditions to the ordinary market crops, viz., cultivation usual to swamp lands, and 6cwt. of potato manure per acre.

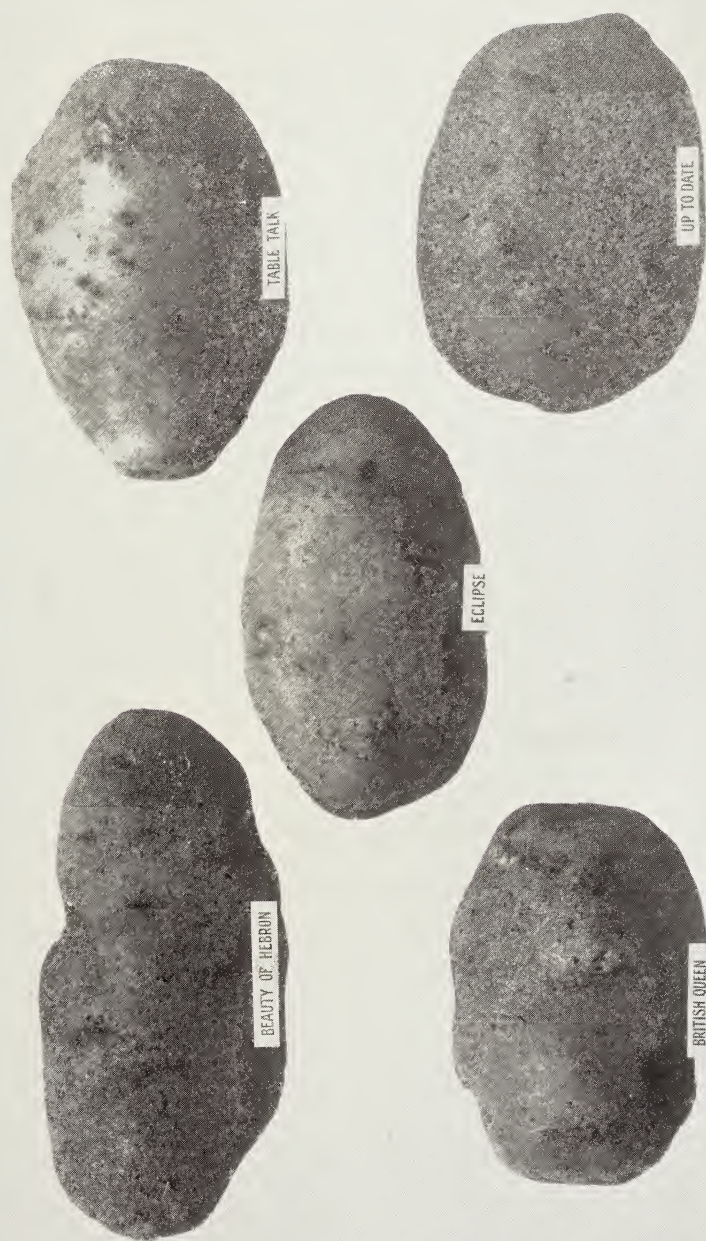
Seed imported from Scotland.

1. *Midlothian Early*.—One of the earliest and most prolific croppers of the White Kidney Potatoes ever imported into the State; comes to maturity



Potatoes grown by Mr. J. Mowforth, Grassmere.





Potatoes grown by Mr. J. Mowforth, Grassmere.

in from eight to nine weeks after sowing. One cwt. of large seed produced 21cwt. of good quality potatoes, similar in shape to *Magnum Bonum*; flesh rather yellow when fully ripe. A strong grower and good cooker.

2. *Eclipse (Fidler's Early Eclipse)*.—A handsome tubered variety and excellent cooker. As a general cropper is hard to excel. A white potato, rather flat; small eyes; and of the very best quality; comes to maturity quickly and is ready for digging in about nine weeks. One cwt. of fairly large seed gave a return of 19cwt. of good marketable stuff. Owing to the quickness of growth both of these varieties are considered very valuable by the grower, as he would be able to get in two and sometimes three crops in the one season.

3. *Epique (Sutton's)*.—White, oval; good cropper and cooker; largely grown. An exceptionally heavy cropper, skin pinkish, rather deep eyes, and quality excellent. Ripens in about nine weeks. One cwt. of small seed produced 25cwts.

4. *Table Talk*.—White, round. Tubers white with a netted skin; splendid cooker; disease-resister; flowers mauve, tipped with white. An improved variety of *Up-to-date*; a vigorous grower, heavy cropper, and good quality. Is ready for market in 14 weeks. One cwt. of large seed gave a return of 21½cwt.

5. *Peacemaker*.—Suitable for garden culture; flowers coloured. A late White Kidney variety, rough netted skin; fairly good quality; heavy cropper of good medium size; takes 16 weeks to mature. Yield, from 1cwt. of small seed, 24cwts.

Seed imported from England.

1. *Up-to-Date*.—White Kidney. Tubers large and finely formed; eyes shallow; first-rate cooker; popular for field and garden; flowers mauve. A well-known variety, grows vigorously, and a good cropper; generally speaking, a profitable variety to grow.

2. *Kiss-me-quick*.—A first-class potato, somewhat similar to the above, but much larger and rounder; is a very heavy cropper and well repays cultivation.

3. *British Queen*.—White Kidney. Heavy cropper; splendid cooker, and highly flavoured; disease resister; excellent for field or garden; flowers white. One of the best all-round general crops; of good quality and much esteemed by the grower.

4. *White Elephant*.—Coloured Kidney. Tubers large; heavy cropper; good cooker; flowers white. Does exceptionally well in this locality, and for the past few years has given an average yield of nine tons per acre. This season, with the new seed, the yield has increased considerably.

Seed from Victoria.

Beauty of Hebron.—White Kidney. Handsome tubers, good cropper; cooks well; suitable for field or garden; flowers white. A well-known American variety; does well in the district; a good average potato both as regards yield and quality, and comes to maturity in fairly quick time.

The other varieties obtained were *Snowdrops*, *Duke of York*, *King Edward*, *Early Vermont*, and *Early Rose*.

After this season's experience, Mr. Mowforth considers the practice of importing seed well worthy of continuation, and the large expenses entailed

have been amply repaid. After disposing on the market of the larger potatoes he still has limited supplies of each of the new varieties left for sale, and sufficient for his own requirements next season. After importing from the three sources, the grower is convinced that the seedsmen of the Eastern States do not pay sufficient attention to the quality of goods sent out, but he speaks very highly of those received from abroad.

In all 13½ acres of potatoes were grown on this property for a yield of 95 tons, and as two acres were a partial failure owing to faulty seed (yielding only one ton per acre), it can be fairly stated that potato growing in these districts is a highly remunerative one, and it appears somewhat strange to me that such a profitable industry is not more embarked in by owners of land in the similar surrounding districts.

Our coastline in the vicinity of Albany is not the only district where potatoes have yielded good results. From Mr. Smales, Muchea Road, East Pinjar, this Department has received samples of *Factor* and *Early Rose* potatoes dug at the beginning of this month. The seeds were planted in new ground with the addition of a little horse manure. The tubers are well grown, of the right size, even, and in all respects suitable for market. They were grown on the margin of a swamp originally under paper bark, blackboy, jarrah, and banksia. The ground is a brown loam, well supplied with vegetable matter.

DATES OF AGRICULTURAL SHOWS.

The undermentioned dates have, under the constitution of affiliation, been fixed by the Royal Agricultural Society of Western Australia as governing body for the various agricultural shows during the year 1909:—

Northam, September 28 and 29.

Irwin, September 29.

York, October 5 and 6.

Greenough, October 6.

Beverley, October 8.

Pingelly, October 12.

Toodyay, October 13.

Geraldton, October 13 and 14.

Narrogin, October 14.

Wagin, October 19.

Katanning (National), October 21, 22.

Moora, October 22.

Kelmscott, October 25.

Williams, October 26.

Swan, October 27.

Murray, October 30.

Perth, Royal, November 2-6.

Kojonup, November 10.

Cannington, November 15.

Bridgetown, November 25.

Bunbury, January 12, 13.

SCOURS IN CALVES.

AN INFECTIOUS DISEASE AND THE WAY TO TREAT IT.

Scours in calves, or calf cholera, in many instances differs from diarrhoea in grown animals, and has special features of its own, taking the form of infectious intestinal catarrh, which is far more serious than the diarrhoea of the full-grown animal.

Scours in calves generally appears suddenly. A perfectly healthy calf may be seized all at once, apparently without any change in food or care. The symptoms of this infantile diarrhoea usually appear during the first two or three weeks of life. In many cases scours appears within a few hours after the animal is born, and the calf may die within from twenty-four to forty-eight hours unless it receives prompt and proper treatment.

It is common for the calf to be afflicted with scours immediately at birth, even before it has had time to suck or take any nourishment whatever.

The faeces or manure is very thin and watery. It has a sour, disagreeable odour, and is usually light coloured. The evacuations are frequent and expelled with force.

The first indication of scours is the soiled condition of the tail, loss of appetite, sunken eyes, sometimes the saliva flowing from the mouth, no attempt being made to swallow. They have a staring look, grow thin and lose strength rapidly. Death usually follows in from twelve to twenty-four hours unless prompt measures are taken to check the disease. If allowed to continue for any length of time the scouring will be accompanied by congestion and ulceration of the intestinal mucous membrane caused by the irritating secretions. As a result of this disease partial or double blindness is sometimes brought on.

To prevent scours in calves, proper care should be given to the mother while pregnant, that she may be able to give birth to a healthy calf. As scours is a germ disease, it is important that the calf be free from this disease when born. Cows afflicted with the disease of abortion convey this disease to their offspring. It is for this reason that calves so often die of scours before they have ever taken nourishment. It is therefore very necessary that the cow be kept free from disease in order to obtain healthy calves.

Calves born afflicted with the germs of this disease in their system are in a position to spread the disease to other calves that may come in contact with the same herd, or if shipped to other herds.

To prevent and overcome scours in calves, they should be given medicines that prevent fermentation of food to allay irritation and congestion, soothe and heal inflamed mucous membrane, act as an antiseptic, and this is quite necessary when the disease is due to a germ.

The most important factor in the raising of cattle is their care while young. Do not think that you are doing the correct thing if you are only managing to keep the life in the calf until it is three months old, and then have it get fat on grass before the winter comes. If you do this, you will be apt to have a lot of stunted calves with their digestive organs destroyed which will never make strong, healthy cattle, and will not be good for either dairy, beef, or breeding animals.—(Wisconsin Experimental Station.)

BRINING BUTTER.

The best way to salt butter is by brining, using 2lb. of salt to each gallon of water, and making sufficient brine to cover the butter in the churn when in a granular form, allowing it to remain ten minutes. By this method the salt gets more evenly distributed, streakiness is avoided, and in summer the grains are hardened.

The amount of salt used can be varied to suit the taste of customers. If a salted butter is required, it can be obtained by letting the butter stand in the brine for a longer period, or making a stronger brine, say 3lb. of salt to 1 gallon of water. The latter method is preferable, as butter which has been left for some time soaking in brine is apt to lose its flavour.

Brine Carefully Strained.

The brine should be carefully strained through two layers of fine muslin into the churn, and the butter and brine well mixed, care being taken that all the butter is covered by the brine and not left sticking on the sides of the churn, but washed down with some of the brine before it is left to soak. If the temperature of the dairy is 60deg. F., the brine should be 47deg. F.

Dry Salting.

If the butter is to be kept for an indefinite period, dry salting is preferable. It should be churned and washed in the usual way, and removed to the butter-worker and worked sufficiently dry after the butter is weighed, and again rolled out on the worker, the salt very finely ground and sifted over it through a hair sieve or a dredger. The salt should not be added all at once, but divided into three portions and added separately, working the butter after each addition until the salt is well worked in. It should then be set aside for twenty-four hours in a temperature not less than 55deg. F., so as to allow the butter and the salt to amalgamate, when it should again be worked. A portion of the salt will have become dissolved in the water which it has drawn from the butter, and this must be pressed out.

Quantities.

The quantity of salt used in dry salting may be from $\frac{1}{4}$ oz. to $\frac{3}{4}$ oz. to every pound of butter. The butter should be carefully filled into glazed stone jars, each layer being firmly pressed with a piece of muslin wrung through brine and held in a roll in the hand. No crevice or air space must be left, and the jar should be filled only to within an inch or two of the top. The surface of the butter should then be made quite smooth, and covered with a piece of smooth muslin wrung through brine, then with grease-proof paper and a layer of fine, dry salt, tied firmly down and put in a cool dry place. The salt used must be pure and dry.—(E. Follett, *Agricultural Gazette*, Eng.)

PHOSPHATIC GUANO DEPOSITS.

Settlers in the Wanneroo district will be interested to learn that deposits of phosphatic guano have been discovered in several caves in the neighbourhood of Yanchep. There are approximately three hundred tons in sight, and the Department of Agriculture, having communicated with Mr. Grant, a resident in that locality, has ascertained that he is willing to deliver to settlers guano from his caves bagged, at the caves' mouth, at £1 14s. per ton. Anyone therefore, requiring this fertiliser is recommended to apply direct to Mr. Grant at Yanchep.

A second cave which also contains guano in this locality is under the control of the Caves Board to whom application will have to be made for permission to extract the fertiliser.

BULLETINS ISSUED BY THE DEPARTMENT OF AGRICULTURE.

Settler's Guide, 2nd, 3rd, 4th and 5th editions.

Handbook of Horticulture and Viticulture (A. Despeissis). 2s. 6d. and 1s.

New Dairying ("Agricola").

Diseases of Honey Bees (John Sutton).

What can be done by the Beginner on the Soil (Hon. James Mitchell, Minister for Agriculture).

Stack Silos (A. Despeissis).

Report of Proceedings of Conference of Producers, 1907.

Factory Dairying (J. A. Kinsella).

Vegetable Growing (G. Chitty Baker).

Examination of the W.A. Poison Plants (E. A. Mann).

Care and Treatment of Milk and Cream (J. A. Kinsella).

Hints to Stock-breeders (Weir).

Meat Inspection and Diseases of Animals (J. B. Cleland, M.D.).

Poultry, Care and Management of (F. H. Robertson).

Back volumes *Journal of Agriculture*.

Tobacco Cultivation (H. Allerton Cowper).

Cotton-growing (H. Allerton Cowper).

Dingo Trapping.

The New Sun-Dial (W. E. Cooke).

The Silo on the Farm (J. A. Kinsella).

Conference of Producers, 1908—Report of Proceedings.

Diseases of animals and Meat Inspection (1908) (J. Burton Cleland, M.D., Ch. M., Sydney).

Trypanosomiasis and other diseases of camels (J. Burton Cleland, M.D., Ch. M., Sydney).

Free copies of such publications as have no prices attached can be obtained on application.

TRANSPLANTING FRUIT TREES.

The tendency is to plant over-sized rather than under-sized trees. The small tree with its root system injured but little will grow off from the start, while the larger one with a big part of its feeders severed will spend a year or two in becoming established.

In taking up the trees preparatory to setting them in the orchard, the roots should be injured as little as possible. Nurseries that do not furnish well-rooted trees should not be patronised.

The roots of the young trees should be exposed to the atmosphere as little as possible. From the time they are removed from the nursery until they are replaced in the ground their roots should be kept covered with some damp material—moss, or sacks dampened, will serve the purpose.

It is essential that the trees be set in a well pulverised and deeply worked soil.

The mutilated roots should be removed before setting the trees. A clean cut should be made, cutting from the under side.

Trees should be planted as deeply as they stood in the nursery. If not steady at this depth, they should be secured with stakes until the roots become re-established.

If manure is to be used around the trees at the time of planting, it should be well rotted and thoroughly mixed with the soil.

The roots should be spread out in a natural position.

Rich soil should be placed around the roots, and worked into place with the hands.

After more dirt has been added, it should be firmly packed. There is little danger in packing the soil too compactly unless it is a stiff clay, or unless the roots are close enough to be bruised.

Finish filling in around the tree and mound up to provide for settling. Do not pack the surface soil.

Prune the branches of the trees to correspond with the pruning that the root systems have undergone.—*Farmer and Settler*.

PUBLICATIONS RECEIVED.

Sixteenth Annual Report Agri. Exp. St. (Minnesota).

Flora Capensis (Thiselton-Dyer), Vol. IV., Sec. 1, Part VI.

Transactions and Proceedings, Botanical Socy., Edin.

Report on Exp. Farms, Canada, 1908.

Vol. 68., Journal of Royal Agri. Socy. of England.

Pineapple Growing in Porto Rico (United States).

Annual Reports, Ontario Agri. and Exp. College and Union.

DANISH DAIRY INDUSTRY.

Official statistics show that some 200,000 farmers in Denmark are engaged in milk production; 2,000 of these have each 100 cows and over, and a large number from 12 to 100; while the smaller holders have from 4 to 12 apiece. The total number of cows is well over one million, and last year the value of butter exported from Denmark was stated at £8,650,000. About 98 per cent. of this total is shipped to Great Britain, and is for the most part consigned to the ports of Grimsby, Hull, Parkeston, Newcastle, and Leith. This enormous and ever-increasing export of dairy produce appears most remarkable when it is stated that the total area of the country is only 15,360 square miles.

The secret of this conspicuous success is in education and co-operation, along with peasant proprietorship. One of the educational authorities in Denmark, discussing this subject, attributed it almost solely to co-operation.

Strange to say, Denmark is a very large importer of Siberian butter, the imports of which in 1907 amounted to 179,050 cwt.

AN UP-TO-DATE FRUIT SHED.

(By G. W. WICKENS, Orchard Inspector.)

When on a visit of inspection recently at the well-known "Blackwood Nurseries," at Mullalyup, owned by Mr. J. Hawter, that gentleman courteously furnished me with his experience of the specially designed cool fruit shed erected by him.

This style of shed is known in the Eastern States as "Meakin's system of fruit storage," and the main object sought to be gained are absence of light and a low, even temperature. The walls of the Mullalyup shed are of wood with a six-inch space between the weatherboards and the inside lining. The floor is double with a six-inch space between, and there is also the same space between the roof and ceiling. The spaces in the floor and walls are filled with powdered charcoal and between roof and ceiling with sawdust. The doors are all made hollow and filled with charcoal. The air is admitted through ventilators at the bottom of the chamber. These ventilators are made by stretching a square of woollen material over a frame and standing it in a shallow tin of water, the woollen material being kept wet by capillary attraction. Tightly-fitting wooden trap doors drop over each ventilator opening, thereby allowing the ventilation to be stopped when required. The air thus entering the shed is cooled considerably and finds an outlet in ventilators fixed in the roof. In the heat of summer the shed is kept closed as much as possible during the day and opened at night. In this way the night temperature can be maintained throughout the day. Should a warm night be experienced the ventilators remain closed.

The building is 65 feet long by 18 feet wide and will hold about 5,000 cases. The lighting is done with acetylene gas. Mr. Hawter informed me

that the shed, which cost £500 to erect, does not quite come up to his expectations. As a place for storing apples it leaves little to be desired, fruit remaining in good condition until very late in the season. But for pears and stone fruits the lowest temperature that can be secured in the shed is not nearly cold enough to prevent decay, and Mr. Hawter in consequence sent hundreds of cases of Bartlett pears to cold storage at Perth this season.

GOVERNMENT LABOUR BUREAU.

REPORT FOR MAY.

Mr. James Longmore, Superintendent of the Government Labour Bureau, reports on the operations during May as follows:—

Perth.

Registrations.—The total number of men who called during the month in search of work was 916. Of this number 467 were new registrations and 449 renewals, *i.e.* men called who had been registered prior to the month of May, and since 1st July, 1908. The trades or occupations of the 916 applicants were as follows:—Labourers 374, farm hands 90, handy lads 72, handy men 62, carpenters 35, bushmen 24, cooks 28, miners 20, gardeners 14, engine-drivers 13, hotel hands 12, grooms 11, yardmen 11, fitters 10, horsedriers 9, bakers, brickmakers, and painters, 8 of each, butchers 7, firemen 6, seamen 6, clerks 5, dairymen, station hands, and strikers, 4 of each, grocers, iron-moulders, joiners, mechanics, orderlies, plumbers, and survey hands, 3 of each, blacksmiths, bricklayers, carpenters (rough), engineers, electricians, linemen, orchardists, saddlers, slaughtermen, and stewards, 2 of each, and 30 miscellaneous.

Engagements.—The engagements for the month totalled 281. The classification of work found was as follows:—Bushmen 86, labourers 70, farm hands 39, sawmill hands 16, handy men 12, handy lads 12, cooks 7, lads for farms 7, miners 5, carpenters 4, quarrymen 4, painters 3, yardmen 3, and 13 miscellaneous.

Fremantle.

Registrations.—The applicants for work numbered 23. There were 15 new registrations and 8 renewals. The classification was:—Labourers 16, handy men 2, carpenters, carters, cooks, handy lads, and irondressers, 1 of each. There was one engagement—a labourer.

Northam.

Registrations.—There were in connection with this branch 19 applicants for work, classified as follows:—Labourers 12, clearers, 3, handy men 2, and farm hands 2.

Engagements.—The engagements were 15, *viz.*, clearers 13, farm hands and handy men, 1 of each.

Kalgoorlie.

Registrations.—The new registrations were 23 and the renewals 26, total 49. The classification was:—Labourers 18, handy men 11, miners 5, engine-drivers 5, blacksmiths, carpenters, and fitters 2 of each, barmen, drivers, firemen, and handy youths 1 of each.

Engagements.—There were 3 engagements, viz., engine-drivers, handy youths, and labourers, 1 of each.

The female servants who called numbered 20. The new registrations were 9 and renewals 11. The classification was:—Generals 7, waitresses 5, cooks 3, light generals 2, and 1 each of laundresses, housemaids, and charwoman. There was one engagement—a general.

Women's Branch, Perth.

Registrations.—During the month there were 82 new registrations and 76 renewals, total 158. The classification was, viz., laundress-charwomen 31, housemaids 30, cooks 22, generals 20, light generals 16, housekeepers 12, useful girls 7, lady helps 4, waitresses 4, cook-laundressess, kitchenmaids, nurses, and married couples 2 of each, and 4 miscellaneous.

Engagements.—The engagements numbered 61, classified as follows:—Laundress-charwomen 29, generals 17, light generals 9, housemaids 2, housekeepers, kitchenmaids, lady helps, and cook-laundressess 1 of each.

General Remarks.

The number of individual men who called at the Central Office, Perth, during the month in search of work was 916. This total is 136 in excess of that for May last year. The engagements for the month were 281, as against 292 for May, 1908. During the month there were 124 men assisted by railway passes from the Central Office, Perth. The fares refunded totalled £97 3s. 11d., and the sum of £9 13s. 3d. was received from employers for payment of fares to send workers, the whole amounting to £106 17s. 2d.

GARDEN NOTES FOR JULY.

BY PERCY G. WICKEN.

July is in ordinary circumstances the wettest month in the year, the soil has become wet and cold, and plants will make very little growth at this period. Those plants that were sown early in the season and whose roots are well spread out will do better than plants recently sown, and as a general rule it will be found that if seeds cannot be sown earlier in the season it will be better to leave them until next month, when the worst of the winter will have passed. Seeds sown in August will probably germinate quicker and soon make as good if not better growth than those planted in July as they are not so likely to receive a check in their growth.

As the soil becomes wet and water-logged it will afford the settler an opportunity of seeing what portions of his property are most in need of

draining; and while the water is lying on the surface he can mark the places where it is necessary to put in drains when the soil is sufficiently dry to allow the work to be carried out. It may not be practical on the score of expense to drain the whole garden or orchard, but a great improvement may often be made by incurring very little expense. It is often the case that in portion of an orchard there is a bank of clay close to the surface, through which the water cannot filter, and all the trees on the higher side of this bank suffer from the stagnant water. A drain or two through this bank will perhaps enable the water to get away, and the trees will immediately begin to improve. Draining can be commenced on a small scale and extended as means permit, and the result will give the owner evidence of the benefit he derives from well-drained soil. Open drains are of course the cheapest to construct, but the inconvenience of working the land and of keeping in repair is so much that it will be found that an underground drain is much cheaper in the long run. Any material which can be cheaply obtained will answer the purpose, hardwood slabs are used in many instances with good results, while round logs laid two on the bottom and one on top will answer the purpose, but agricultural drain-pipes can now be purchased at such small cost that in most cases they will be found cheaper than anything else that can be used, and once properly laid they will last for a lifetime. To drain an acre of land with drains 30ft. apart requires only 1,450 pipes, and as the pipes can be obtained for about 50s. per 1,000 the cost is not great. In draining an orchard a row of pipes can be put first between every second row of trees and later on between every row if the results warrant it. Agricultural pipes are one foot in length, and when laid in sandy ground should have grass or bushes laid over them before the soil is filled in; this will prevent the sand from getting between the joints and will also increase the efficiency of the drain. Pipes 2in. in diameter are large enough for short drains a few chains in length, but if the drains are long and have to carry a large quantity of water, pipes of a larger diameter are necessary. The drains should not be less than 30 inches deep, and must have sufficient fall to enable the water to run. The effects of the draining will be to make the soil dryer and warmer in the winter, and also moister in the summer, as it is a well-known fact that drained land remains more moist during the hot weather than undrained land. Drained land can be worked all the year round, while land which is not naturally or artificially drained becomes too wet in winter and too dry in summer.

Where the land is sufficiently dry those parts of the garden not in use should be dug up and mixed with a dressing of stable manure ready for planting when required, the more soluble forms of fertiliser will be better put on later, or at the time of seeding, or putting out the young plants.

Artichokes (Globe) should be planted in the early spring. The plant requires plenty of stable manure. The plant grows to a large size and produces quantities of flower buds, which are used as a vegetable before the buds open. Plant in rows 3ft. apart and the same distance in the rows.

Artichokes (Jerusalem) are grown from the tubers which form at the roots of the plant. Plant same as potatoes. Land should be prepared ready for sowing next month.

Asparagus.—Prepare land by trenching and digging in a quantity of well-rotted stable manure. In the warmer districts a few plants may be put out, but in most localities they will do better in August. Connover's Colossal is a good variety to grow.

Beans (Broad) should now be bearing. In the cooler localities a few more rows may be sown. Giant Long Pod is a good variety.

Brussel Sprouts.—May be planted out at the present time; the plants should be raised in seed beds and planted out the same as cabbage.

Cabbage.—Put out as many plants as you are likely to require; if more are grown than are required for home consumption they can be sold or used for the stock, poultry, and pigs on the place; they need never be wasted. Put out strong healthy plants only, weak spindly plants will never grow to good cabbages. Succession or Pedigree cabbages will be found good varieties to grow.

Cauliflower.—Any strong plants from the seed beds may be planted out.

Carrot.—Thin out and weed those already up and sow a further supply. Sow in rows 18 inches apart, and thin out from 4 to 6 inches apart when they come up. St. Valery is a favourite variety.

Cucumbers.—In warmer localities a few plants may be raised in hot-beds, or under frames, for planting out later on.

Celery.—Prepare trenches as previously described for planting out later on. Plant out any plants available in trenches already prepared and earth up any plants that have made good growth.

Leek.—Plant out all seedlings that are available, first cutting back the roots and trimming off the leaves. They require a well-manured soil as they must be grown quickly.

Lettuce.—Plant out in beds all plants that are available and sow a further supply of seed. The land must be well-manured; the plants want to be quickly grown or they become bitter.

Onions.—Plant out in drills about 18 inches apart all the young seedlings that are available. The soil requires to be well-manured and worked to a fine tilth. The plants should be about 6 inches apart in the rows. As the plants grow the ground should be kept well-hoed and free from weeds. A little seed may be planted for future use.

Peas.—Plant out a full supply as early as possible, there is always a good demand for them. They should be sown in drills 3 feet apart and well-manured with superphosphate and sulphate of potash. As the plants grow it will pay to put sticks in the ground for them to climb upon; they will bear heavier crops and be easier picked.

Potatoes.—In localities where the danger from frost is slight, potatoes may be planted for an early crop. Where frosts are likely to occur the ground should be got into good order ready for planting as early as safe.

Tomatoes.—In warmer localities plants can be raised under glass or in boxes ready for planting out for an early crop. In selecting varieties to grow choose only those with smooth skins; they always sell better than others.

Turnips.—Thin out those already up and cut down all weeds. Sow a few rows for future use, particularly of the Swede variety. The variety known as Laing's Garden Swede is a good one to sow at the present time.

ORCHARD AND FLOWER GARDEN.

In the orchard, plant fruit trees, ornamental trees, and shrubs, roses, evergreens, and deciduous shrubs, trees, climbers, etc.

For the Flower Garden, make early sowings of half-hardy or tender annuals on heat. Plant Gladioli. Sow Begonias.

When planting fruit trees (says an exchange), too little attention is given to the food the trees require. It is acknowledged that feeding fruit trees is a complex problem, but there are some well-known guiding principles in the results of chemical analyses of the wood of the tree and the fruit after being burnt. These show that in the growth of apple-tree wood, lime and potash are the predominating ingredients required. Lime in any form should be supplied, but one of the best is old mortar rubbish thoroughly broken up and put through a fine sieve. Another good method is to apply liberal quantities of bone meal; that from ground bones is better than that obtained from dissolved bones; but no matter what form is adopted, give fruit trees as much lime as possible.

FARM.

Seeding should if possible be completed in May, but many settlers, owing to their not having sufficient horse power available, are compelled to prolong their seeding during June, but every effort should be made to get it completed as early in the month as possible. Where this cannot be done it would probably be found more profitable to wait until August and sow a spring wheat such as Allora Spring or Early Para, which have in the Southern districts given some good results. Fallowing will in most cases be completed and if not the ground will probably be getting too wet to allow it to be carried out; working the land when in a wet condition is likely to cause it to set hard and does more harm than good.

During the wet weather in July opportunity should be taken of the slack time to get all implements put in order for immediate use when required, to repair the harness, and do many of the odd jobs about the homestead for which time cannot be spared when the sowing or harvesting operations are in full swing.

An annual stocktaking is an operation that is carried out on very few farms, but every farmer should take an annual stocktaking and valuation of his plant, the same as a firm engaged in any other industry does. The actual bank balance at the end of the year does not represent the profit made on the year's transactions, as the stock may have been increased or decreased during the year, or other improvements made on the farm which may increase the value. All useless articles should be written off and an allowance made for depreciation of implements and machinery. July is the best month for this work, as it is one of the slackest on the farm; also all the crops grown since last July are harvested and probably sold, lambing has taken place, the crop for the coming season has been planted, and a very correct estimate of value can be made.

MARKET REPORTS.

GENERAL SUMMARY.

FARM PRODUCE.

A good deal of inferior chaff has been offered. Large quantities of other grades have come in and the effect on the market somewhat depressing, demand not meeting supply. Prices ranged from £4 17s. 6d. for prime, £4 10s. good medium, and £4 for inferior.

Wheat realised from 3s. 9½d. to 3s. 10d.

LIVE STOCK.

The market has been active, the demand for good store stock being good and found quick sales at country yards. Local fat stock are in scarce supply, but there should be an improvement now showing itself. Pigs are not equal to the demand, and very good prices are obtained.

The following are average quotations:—

Sheep.—Mixed, 13s. 6d. to 15s. 7d.; weaners, 8s. 7d. to 12s. 3½d.; fat wethers, up to 20s.; store wethers, 14s. 6d.; hoggets, 8s. 2d. to 12s.; ewes, 13s. 6d. to 14s. 3d. and 16s. 6d.

Cattle.—Cows, £5 5s. and £8; heifers, £2 5s. and £11.

Horses.—£5, £30, £34 10s.; also geldings, £26, £36, £9 10s., and £15; pony, £10; mares, £16; stallion, £30; filly, £7; colt, £14 and £7.

Pigs.—Porkers, 25s. to 28s.; slips, 12s. to 15s. 6d.; sow, £2 to £3; boar, 50s. baconers, 48s.; light porkers, 20s. to 28s.

LOCAL PRODUCE MARKETS.

The following quotations give the average state of the local markets in fruits, vegetables, and poultry during the month:—

Fruit.—Apples: Jonathans, 4s. 3d. to 7s.; Rymers, 4s. 6d. to 5s. 3d.; Dunn's Seedling, 5s. 3d. to 6s. 9d.; Rome Beauties, 5s. to 7s. 3d.; Stone Pippins, 4s. 3d. to 5s. 6d.; Northern Spies, 5s. to 6s. 6d.; Cleopatra, 5s. 9d. to 6s. 6d.; Yates, 8s. 3d. to 9s. 6d.; Sturmers, 6s. to 6s. 3d. Oranges: Navels, 8s. to 11s. 2d., 4s. 6d. to 8s. 9d. Mandarins, 8s. to 13s. 9d. Lemons, 4s. 9d. to 8s. 6d. Pears: Vicars, 5s. 6d. to 7s. 6d.; Bruce Park, 5s. to 6s.

Vegetables.—Cabbage, 4s. 6d. to 6s. 9d.; others, 2s. Potatoes, 10s. 9d., new dug; others, 5s. 6d. upwards. Parsnips, 1s. 2d. to 1s. 6d. Carrots, 6d. to 1s. 1d. Beetroot, 9d. to 1s. 3d.; others, 4d. to 8d. Turnips, 7d. to 1s. Swedes, 4s. 6d. to 5s. 6d. bulk; 9d. to 1s. 3d. bunch. Peas, 3d. to 4d. French beans, 3d. to 4d. Pumpkins: Ironbark, 5s. 6d. to 6s. 9d.; bugles, 3s. to 4s. Cauliflowers, 4s. 6d. to 7s. 6d.; others, 1s. to 2s. 9d. Leeks, 4d. to 5d. Artichokes, 1½d. Chillies, 3d. to 3½d. Garlic, 3d. to 3½d. Rhubarb, 1d. to 1½d. Lettuce, 1s. 3d. to 2s. 7d. Sweet potatoes, 1d. to 1½d.

Poultry.—Hens, 2s. 9d. to 5s. 9d.; cockerels, 4s. 3d. to 7s.; ducks, 5s. 3d. to 10s. 9d.; geese, 6s.; muscovys, 12s.; guinea fowls, 3s. 9d. to 4s. Eggs, 1s. 10d. to 2s. 0½d.

MELBOURNE PRODUCE MARKET.

Melbourne, June 9.

Wheat, 4s. 11½d. to 5s. 0½d.; flour, £11 10s.; bran, 11d.; pollard, 1s. 1½d.; oats, 1s. 8d. to 1s. 11d.; maize, to 4s.; peas, 4s. 6d. to 4s. 7d.; chaff, £2 10s. to £3 5s.; potatoes, £2 15s. to £4; onions, £5 to £6 10s.

ADELAIDE PRODUCE MARKET.

Adelaide, June 9.

Wheat is dull, rates being unaltered at around 5s. Flour had a small output at previous rates. Bran eased ½d., being quoted at 11½d. Pollard, 1s.

LONDON PRODUCE MARKET.

Messrs. W. Weddel & Co., under date London, May 7, report as follows:—

Wool.—Since our last report the market has continued exceedingly firm. On the Continent, as well as at Home, all grades of raw wool have moved freely, the consumption being on a large scale. Under these favourable conditions the third series of sales commenced here on the 4th inst., the available quantities being as follows:—

Australian	..	..	69,000	bales
New Zealand	..	..	101,200	„
South African	..	..	7,300	„
South American	..	..	18,300	„
			<hr/>	
			195,800	„
			<hr/>	

The attendance of buyers is large and competition spirited, the usual Continental and Home houses being reinforced by a somewhat exceptional number of buyers from the United States of America. Greasy merinos of good combing length, especially when in light condition, have moved up about 7½ per cent. over March rates, with the shorter and heavier lots on an average 5 per cent. Scoureds are about 5 per cent. dearer all round. Fine crossbreds have met an excellent demand, and a 10 per cent. advance may be quoted on these. Medium grades have gone up about 7½ per cent., and the ordinary coarse lots have improved a good 5 per cent. American competition has been keen on fine and medium qualities, and on their particular lots there are occasional advances of about anything from 10 per cent. to 15 per cent. Crossbred lambs have been an excellent market. Slipes were also in good request, and make on average about 10 per cent. more money.

The series is due to close on the 21st inst., and with the moderate quantity available there is no reason for anticipating any falling away in prices. It should not be forgotten, however, that merinos stand now at high figures.

Arrivals to date for the fourth series of sales, which commence here on 6th July, 1909, amount to 26,400 bales, of which 18,200 bales are from New Zealand, 7,500 from Australia, and the balance from South Africa.

Grain.—*Wheat, etc.*—At the beginning of last week the market had a decided downward tendency, but towards the end of the week there were signs of returning firmness which has steadily developed, and prices are again almost back to recent highest level. The speculative movements in America

have in no way affected the position of wheat. To "bear" operators, shipments to Europe have been disappointingly small, as it was confidently expected in some quarters that the break in American prices would set free a large quantity of wheat. This has not resulted, and a further "bull" point has been the reports of serious damage to the winter wheat crops in some of the principal States of America. Reports from the Continent regarding the winter sown crops are also unsatisfactory, particularly in Russia, Germany, and France, while reserve stocks in the U.K., Germany, and Italy are materially reduced and will have to be further drawn upon before harvest time in view of the smaller shipments afloat, and which are inadequate for normal requirements. At the close the market is firm, with values tending upwards.

The weather has been bright, but the temperature too low to be congenial to the young grain plants. On the whole, the wheat plant in England is healthy but backward for the time of year.

English Wheat.—Supplies are small, and farmers are holding for full prices, viz.:—46s. to 47s. delivered per 480lbs. The average price last week of 42s. 5d. per imperial qr. marks an advance of 3s. 10d. per qr. from the previous fortnight, and is 10s. 11d. per qr. higher than at the same time last year.

Australian Wheat.—Ex store.—Supplies in very small compass. We quote:—46s. 6d. to 47s. per 496lbs.

Frozen Meat.—General Market.—A moderate demand is being experienced, but quite insufficient to cope with the heavy supplies. Home-grown sheep are less plentiful and may now be quoted at 6¾d. @ 7½d. for Scotch, and 6¼d. @ 7d. for English. Prime beef is scarce and commands full prices, and ordinary quality chilled beef is dearer on account of reduced supplies. Sides of States beef realise 5¾d. @ 5½d. State cattle are quoted at £16.10s. @ £22 10s.; and Canadian at £15 @ £19 10s. per head.

No change can be recorded in the position of the frozen meat trade. Any increase in the demand resulting from present low prices is more than counter-balanced by the heavy stock on hand, and the market for all descriptions of meat is weak.

Australian.—Arrivals amount to 52,780 carcasses during the fortnight. Heavy supplies and low prices of other descriptions of frozen mutton have checked the sale of Australian carcasses, which, although ⅛d. to ¼d. per lb. cheaper during the fortnight, cannot be sold at all freely. Small carcasses cannot be quoted at over 2¼d. per lb., and heavy weights at 2 1-16d. @ 2 3-16d. Small ewes realise in the neighbourhood of 2d. @ 2½d. per lb.

Lamb.—The demand for Australian lambs is disappointingly slow at about 3½d. @ 3¾d. for small weights of good quality, and 3¾d. @ 3½d. for ordinary quality and the larger weights. River Plate lambs are offered at 3¾d. up to 3¾d. per lb., according to size and quality; and some Patagonian lambs of fair quality are being marketed at Smithfield and in the Provinces.

Rainfall for the month of May, 1909, recorded at telegraphic stations in Western Australia, and averages.

Published by Authority under the direction of H. A. Hunt, Commonwealth Meteorologist.

STATIONS.	*Total for May, 1909, in points.	No. of wet days.	Average for May.	No. of Years Records.	STATIONS.	*Total for May, 1909, in points.	No. of wet days.	Average for May.	No. of Years Records.
TROPICS :					NORTH COOLGARDIE				
Wyndham ...	Nil	...	31	22	FIELDS :				
Turkey Creek ...	Nil	...	15	11	Sandstone ...	24	5	...	...
Hall's Creek ...	Nil	...	47	18	Wiluna ...	142	3	128	10
Fitzroy Crossing ...	2	1	26	15	Mt. Sir Samuel ...	81	2	107	8
Derby ...	48	1	98	23	Lawlers ...	38	4	94	12
Broome ...	98	2	40	19	Mt. Leonora ...	64	3	103	11
La Grange Bay ...	18	1	42	18	Mt. Malcolm ...	40	3	112	11
Wallal ...	59	1	33	12	Mt. Morgans ...	26	2	125	9
Condon ...	57	3	41	19	Laverton ...	105	3	132	9
Bamboo Creek ...	5	2	75	11	Murrin Murrin ...	40	3	122	10
Marble Bar ...	24	2	65	14	Yundamindera	67	2	154	8
Warrawoona ...	19	1	64	9	Kookynie ...	52	3	151	7
Nullagine ...	42	3	58	11	Niagara ...	37	2	113	12
Port Hedland ...	162	2	79	11	Menzies ...	75	3	116	12
Whim Creek ...	83	2	74	11	Mulline ...	42	4	178	7
Roebourne ...	20	3	66	22					
Cossack ...	Nil	...	88	27	COOLGARDIE GOLD-				
Fortescue ...	61	3	205	21	FIELDS :				
Onslow ...	14	2	181	23	Davyhurst ...	64	5	199	7
Winning Pool ...	73	3	132	11	Goongarrie ...	37	4	116	13
WEST COASTAL :					Broad Arrow ...	81	5	156	11
Carnarvon ...	62	4	117	26	Kurnalpi ...	147	4	138	12
Sharks Bay ...	147	4	157	15	Kanowna ...	54	5	129	13
Wooramel ...	91	4	190	10	Bulong ...	36	3	140	12
Hamelin Pool ...	58	5	120	23	Kalgoorlie ...	82	5	129	13
Northampton ...	247	7	281	27	Coolgardie ...	77	4	128	16
Mullewa ...	142	9	171	13	Burbanks ...	85	4	149	10
Geraldton ...	343	10	285	31	Widgemooltha ...	101	6	141	11
Greenough ...	249	9	310	27	Norseman ...	132	5	121	12
Dongarra ...	288	11	326	25	Boorabbin ...	123	6	...	14
Minginew ...	199	11	234	13	Southern Cross	79	9	137	19
Carnamah ...	159	8	312	21					
Dandarragan ...	358	7	360	11	S.W. COASTAL :				
Moora ...	250	9	229	11	Gingin ...	457	11	468	20
Walebing ...	300	10	237	25	Kalamunda ...	648	12	...	...
New Norcia ...	346	10	260	26	Guildford ...	551	11	490	29
MURCHISON FIELDS :					Perth Gardens ...	514	16	494	33
Peak Hill ...	90	4	89	11	" Observatory	560	15	461	12
Abbotts ...	97	3	...	10	Fremantle ...	632	17	448	31
Gabanintha ...	220	5	94	9	Rottneft ...	383	14	426	27
Nannine ...	85	5	76	14	Rockingham ...	876	16	470	11
Cue ...	71	5	104	14	Jarrahdale ...	920	18	548	26
Day Dawn ...	52	3	109	13	Mandurah ...	655	19	512	19
Lake Austin ...	50	4	131	11	Pinjarrah ...	752	19	535	30
Lennonville ...	48	3	144	8	Collie ...	634	17	478	9
Mt. Magnet ...	28	4	104	14	Brunswick Junct.	920	22	...	...
Yalgoo ...	138	7	146	12	Bunbury ...	816	18	529	32
Murgoo ...	28	1	112	20					

*100 points=1in.

RAINFALL—continued.

STATIONS.	*Total for May, 1909, in points.	No. of wet days.	Average for May.	No. of Years Records.	STATIONS.	*Total for May, 1909, in points.	No. of wet days.	Average for May.	No. of Years Records.
S.W. COASTAL—continued.					S.W. INLAND—continued.				
Donnybrook ...	598	18	555	8	Arthur ...	321	14	216	18
Busselton ...	641	20	453	28	Wagin ...	225	10	198	18
Cape Naturaliste ...	532	20	517	5	Katanning ...	176	13	215	17
Karridale ...	482	25	634	15	Broomehill ...	214	14	205	18
Cape Leeuwin ...	574	26	549	12	Kojonup ...	251	11	279	24
					Greenbushes ...	557	20	471	16
S.W. INLAND:					Bridgetown ...	422	20	444	21
Kellerberrin ...	141	8	163	16					
Meckering ...	192	8	223	11	SOUTH COASTAL:				
Newcastle ...	432	9	281	29	Mt. Barker ...	365	19	293	22
Northam ...	184	11	221	28	Albany ...	606	20	474	32
York ...	252	11	234	32	Breaksea ...	543	18	370	19
Beverley ...	288	9	215	26	Bremer Bay ...	293	11	324	24
Brookton ...	191	9	...	...	Hopetoun ...	258	8	250	7
Wandering ...	307	18	301	20	Ravensthorpe ...	158	7	160	7
Pingelly ...	191	11	214	18	Esperance ...	376	10	286	25
Narrogin ...	306	16	233	17	Israelite Bay ...	183	12	191	24
Marradong ...	444	18	397	11	Balladonia ...	136	8	110	18
Williams ...	336	17	263	24	Eyre ...	260	9	152	24

*100 points lin.

REMARKS ON THE RAINFALL FOR MAY, 1909.

With the exception of Broome, the rainfall throughout the Kimberley division is below the average, whilst the N.W. division also shows a deficit, excepting the coastal areas between Wallal and Whim Creek.

The whole of the Gascoyne and the goldfields, leaving out the country between Peak Hill, Wiluna, and Gabanintha, and also one or two isolated stations, shows a decrease, but throughout the S.W. and S. an excess is shown, excepting at stations to the north of Gingin and Moora and a narrow strip of country from Karridale eastwards to Katanning as well as a few stations in the eastern agricultural areas, namely, Northam, Kellerberrin, and Pingelly.

No rain fell in the East Kimberley division, whilst only a few showers were recorded in the West Kimberley division during the first few days.

In the N.W. division light scattered rain was registered between the 3rd and 5th and light from Fortescue to Winning Pool on the 20th; otherwise dry conditions prevailed.

Throughout the Murchison and Coolgardie Fields general light to moderate rain fell on the 4th, whilst light scattered showers were registered on the 3rd over the Murchison and North Coolgardie Fields. Excepting one or two light showers nothing further was recorded till the 19th, when light to moderate rain, heavy at Gabanintha, fell on the Murchison, and light scattered over the southern Coolgardie Fields, while general rain was recorded throughout on the 22nd and light to moderate showers were noted on the 30th and 31st over the South Coolgardie Goldfields.

Turning now to the South-West, general rain fell on the 4th and again on the 11th, showery conditions being noted between these dates.

The following three days were generally fine. Rain was fairly general on the 16th, scattered on the 17th and 18th, and general between the 19th and 22nd, as well as on the 30th. Between the 22nd and 30th the weather was showery at places, particularly in the South-West coastal portions.

Weather Bureau,

Perth, W.A., 31st May, 1909.

EDITORIAL REQUEST.

Correspondence and Queries are invited from subscribers and readers of the Journal on any subject of interest to agriculturists and other settlers on the land, either conveying useful information or seeking it. Suitable letters and contributions will be published and answers to queries given in the succeeding issue, if communications are received by the Editor not later than the fifteenth of each month.

Secretaries of Agricultural Associations, Societies, and Farmers' Clubs are kindly requested to supply corrections of the lists published in the Journal, such as changes of appointments, dates of shows and meetings, as well as any other items of interest.





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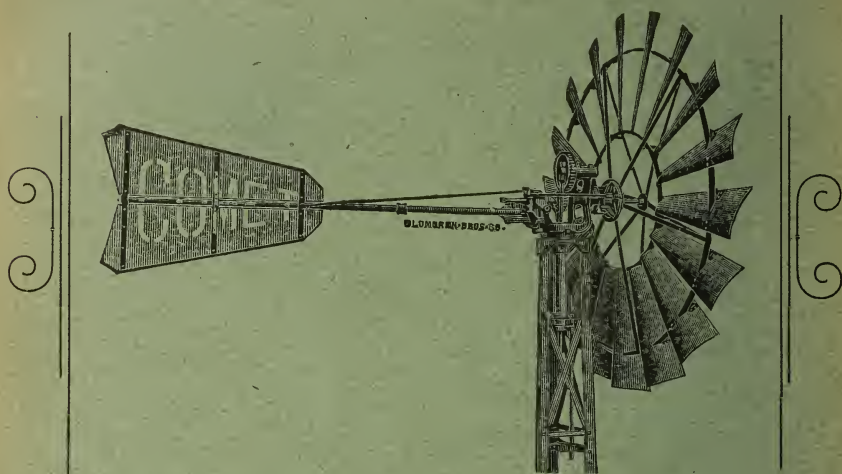
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AGRICULTURAL AND OTHER SOCIETIES.

SOCIETIES AFFILIATED WITH THE ROYAL AGRICULTURAL SOCIETY OF W.A.

SOCIETY.	SECRETARY.
Albany Agricultural and Horticultural Society	W. H. Richardson, Albany
Beverley Agricultural Society	G. Townley, Beverley
Bridgetown Agricultural Society	T. Rossiter
Bunbury Agricultural Society	W. S. Hales
Busselton Agricultural Society	A. R. Bovell
Cannington Agricultural and Horticultural Society	W. E. Cockram, Canning
Donnybrook Agricultural Society	F. H. Layton
Geraldton Agricultural Society	W. Cassel Brown, Geraldton
Great Southern Pastoral and Agricultural Districts' Society	W. W. Brunting, Katanning
Greenough Farmers' Club	J. E. M. Clinch, Greenough
Irwin Districts Agricultural Society	F. Waldeck, "Bonniefield," Dongarra
Jandakot Agricultural Society	F. W. Martin, Post Office, Janda- kot
Jarrahdale and Serpentine Agricultural Society	W. J. Watson, Mundijong
Katanning Agricultural Society	W. W. Bruntton
Kelmscott Agricultural Society	H. Cross, Kelmscott
King River Settlers' Association	R. H. Playne, Albany
Kojonup Agricultural Society	A. J. McGrath, Kojonup
Lower Blackwood Farmers' and Graziers' Association	P. D. E. de Néve, Lower Black- wood
Moora Agricultural Society	P. W. Glacken
Mt. Barker Rural Association	A. E. Parker, Mount Barker
Murray Agricultural Society	J. D. Paterson, Pinjarra
Narrogin-Williams Agricultural Society	G. G. Lavater, Narrogin
Nelson Agricultural Society	T. Rossiter, Bridgetown
Northam Agricultural Society	V. H. Spencer, Northam
Pingelly-Mourambine Agricultural Society	A. A. Kent, Pingelly
Royal Agricultural Society of W.A.	Theo. R. Lowe, Perth
Southern Districts Agricultural Society	Percy Smith Bignell, Busselton
South-West Central Agricultural and Horticultural Society	F. H. Layton, Donnybrook
Swan Agricultural and Horticultural Society	H. A. Devenish, Guildford
Toodyay Agricultural Society	A. James, Newcastle
Wagin-Arthur Districts Agricultural, Horticultural, and Industrial Society	W. E. Clarke, Wagin
Wellington Agricultural and Pastoral Association	W. S. Hales, Bunbury
Williams Agricultural Society	H. V. Carne, Williams
York Agricultural Society	J. E. Spark, York

UNAFFILIATED SOCIETIES.

Albany and District Settlers' Association	J. Mowforth, Albany
Albany and King River Settlers' Association	R. H. Playne, King River
Armada Progress Association	John Gould, Armadale
Balingup Farmers' Association	P. V. Mauger, Balingup
Bedfordale Agricultural and Horticultural Society	T. W. Ottaway, Bedfordale,
Boyanup Farmers' and Progress Association	R. A. Payne, Boyanup
Boyp Brook Agricultural and Vigilance Committee	Wm. Vincent, Boyp Brook
Brunswick Farmers' Association	Arthur E. Clifton, Brunswick
Bullsbrook Progress Association	D. Strachan, Bullsbrook.
Capel Farmers' Association	C. J. Rooney, Capel.
Central Fruitgrowers' Association	A. Barratt, Perth
Cooze-Spearwood Agricultural and Horticultural Society	R. Barton, Hamilton-road, Spear- wood
Cookernup Farmers' Progress Association	A. L. Cunnold, Cookernup
Dangin-South Caroling Progress Association	W. G. Haines, Caroling, East Beverley.
Darling Range Horticultural Society	A. C. Armstrong, Sawyers' Valley
Deepdale Farmers' and Fruitgrowers' Association	Chas. M. Lukin, Newcastle
Denmark Settlers' Association	H. V. Beckley, Denmark
Drakesbrook Agricultural Association	H. McNeill, Drakesbrook
Esperance Agricultural, Horticultural, and Floricultural Society	R. H. Dean, Esperance
Fremantle Horticultural Society	Hugh C. Anderson, Hon. Sec., c/o Union Stores, Ltd., Fremantle
Goldfields Dog, Poultry, and Horticultural Society	J. A. McNeill, Coolgardie
Goldfields Agricultural Society	Mounmouth Smith, Kalgoorlie
Goomalling Farmers' Association	W. Gray, Goomalling, via Northam
Greenhills Farmers' Club	James McManus, Irishtown
Greenough Farmers' Association	J. McCartney, Walkaway
Harvey Farmers' Club	W. E. Ash, Hon. Sec., Harvey
Harvey Citrus Society	Kenneth Gibson, Harvey
Horticultural Society of W.A.	L. S. Dean, c/o Messrs. Sandover and Co., Perth
Jennapullen Agricultural Society	A. C. Morrell, Jennapullen
Jurakine Agricultural Society	W. Hayward, Jurakine
Kalamunda Horticultural Society	A. Sanderson, Kalamunda
Lake Pinjar Agricultural Association	H. Hartman, Pinjar
Mandurah Progress and Agricultural Association	C. Tuckey, Mandurah
Marbellup and District Settlers' Association	F. Mullineaux, Evergreen Valley Marbellup, G.S.R.
Margaret River Progress Association	L. E. de Mole, Margaret River.

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Monwongie Progress Association	E. A. Batt, Monwongie, Papan-yinning
Moonyoonooka Farmers' Association	W. H. Williams, Moonyoonooka
Murray Horticultural Society	Miss M. Alderson, Pinjarra
Newcastle Branch Bureau	W. A. Demasson, Newcastle
Newtown Progress Association	T. A. Thurkle, Woodlands, Vasse
North Greenough Farmers' Association	W. F. Stansfield, Bootenall
North Lake Progress Association	A. R. F. Johnston, c/o W. Lyons, South Road, Fremantle
Parkerville Agricultural Society	S. Ramsay, Parkerville
Plantagenet Beekeepers' Association	Vacant.
Popanyinning Progressive League	F. R. Bayliss, Popanyinning Pool, G.S. Railway
Preston Progress Association	T. B. Jones, Preston
Quindalup Progress Association	W. E. Carter, Busselton
Spearwood Progressive Association	R. Barton, Hamilton-road, Spearwood, Fremantle
Talbot Progress Association	O. Ryan, York.
Thomson's Brook Progress Association	J. W. Padman, Thomson's Brook.
Toodyay Vine and Fruitgrowers' Association	W. A. Demasson, Newcastle.
Tenterden Agricultural Society	J. Lunt, Tenterden
Upper Chapman Farmers' and Fruitgrowers' Association	D. O'C. Kehoe, Narra Tarra
Victoria Plains Farmers' Association	J. Halligan, Summer Hill, Victoria Plains
Waigerup Agricultural Hall Association	W. J. Eastcott, Waigerup
Wandering District Agricultural Society	W. B. Smithson, Wandering
Wanneroo Farmers' and Gardeners' Association	F. J. Hollins, Wanneroo
Waterloo Farmers' Vine and Fruitgrowers' Association	T. W. Harris, Waterloo
West Swan Producers' Association	J. H. Stone, Guildford
Wongamine Farmers' Club	G. W. B. Smith, Wongamine
Wonnerup Progress Association	P. S. Brockman, "Reinscourt," Busselton
Wooroloo Progress League	T. H. Ilbery, Wooroloo
W.A. Beekeepers' Association	W. Potter, Goldsworthy Road, Claremont
Wagin Beekeepers, Poultry Fanciers, and Fruitgrowers' Association	F. A. Pfeiffer, Wagin.
West Albany Settlers' Association	Alfred Burvill, Gasmere, via Albany
West Coolup Progress Association	Stanley Caris, Pinjarra
West Pingelly Progress Association	J. J. Parker, Neta Vale, Pingelly.
Yorkrakine Progress Association	Walter R. E. Powell, Yorkrakine.

POULTRY AND DOG SOCIETIES.

SOCIETY.	SECRETARY.
Albany	J. F. Cuddihay, Albany
Boulder	W. R. Rossiter, Boulder
Bunbury	E. Krachler, Bunbury
Claremont	C. H. Evans, Claremont
Collie	A. E. Smith, Collie
Coolgardie	J. S. Stewart, Council Office, Coolgardie
Fremantle	A. J. Parkin, Queen Street, Fremantle
Gingin	Chas. W. Johnson, Gingin
Kalgoorlie	H. R. Bristow, Kalgoorlie
Subiaco Poultry, Pigeon, and Cage Birds' Society	E. Austin, Hensman Road.
West Australian	Jas. Bolt, Hay Street.
West Australian Canary, Pigeon, and Bantam Club	Harry Barnett, 159 Barrack Street, City.
West Australian Minorca Club	E. J. Ford, Rockton Road, Claremont.

DATES OF MEETING OF SOCIETIES.

- Albany and District Settlers' Association—
At Torbay Junction.
- Armada Progress Association—
Last Tuesday in each month, at 8 p.m.
- Boyanup Farmers' and Progress Association—
First Saturday in each month.
- Brunswick Farmers' Association—
Wednesday preceding full moon, at 8 p.m., at the Agricultural Hall.
- Capel Farmers' Association—
Last Saturday on or before the full moon, at 8 o'clock.
- Greenough Farmers' Club—
January, April, July (annual), and October.
- Jarraldale and Serpentine Agricultural Society—
Meet the Saturday preceding the full moon, at 8 o'clock p.m., at the Agricultural Hall, Mundijong.
- ROYAL AGRICULTURAL SOCIETY OF W.A.—
Second Tuesday in each month.
- Upper Chapman Farmers' and Fruitgrowers' Association—
Last Saturday in the months of December, February, April, July, August.
- W.A. Beekeepers' Association—
Second Wednesday in each month, Museum, Department of Agriculture, 7-30 p.m.
- Wanneroo Farmers' and Gardeners' Association—
Saturday on or before full moon, at Wanneroo State School.
- West Coolup Farmers' Association—
Second Saturday in each month, at 3 p.m., at Mr. Barry's residence.



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- (b.) Discharging any mortgage already existing on holding; or
- (c.) The purchase of stock for breeding purposes,

ON THE SECURITY OF:—

- (a.) Holdings in fee simple; or
- (b.) Holdings under Special Occupation Lease or Conditional Purchase from the Crown; or
- (c.) Homestead Farms; or
- (d.) Such other real or leasehold property as the Trustees may think fit.

Advances may be made of an amount not exceeding £300 to the full value of the improvements proposed to be made.

Further advances may be made of an amount not exceeding £200 to one-half the value of the additional improvements proposed to be made.

No advance shall be made to discharge an existing mortgage to an amount exceeding three-fourths of the value of the improvements already made on the holding. The improvements recognised for this purpose are:—Ringbarking, clearing, fencing, draining, and water conservation. Advances are not made for "completion of purchase"; liabilities which have been incurred in the development of the security only being recognised.

At no time shall the advances to any one person (or number of persons if borrowing conjointly) exceed the sum of £500, and no sum exceeding £100 shall be advanced to any one person for the purchase of breeding stock. In applications for this purpose, the condition and capability of the security to successfully carry stock is of paramount importance.

Persons under 21 years of age, being unable to legally mortgage, are debarred from borrowing from the Bank.

Every application for an advance must be made on the Bank's forms, and shall contain all particulars required thereon.

Applications may be for sums of £25 or any multiple thereof, not exceeding £500. Each application must be accompanied by a valuation fee of 1 per cent. of the amount applied for. No refund of fee is allowed after an inspection of the security has been made.

Mortgages are prepared free of charge, but borrowers are required to pay the statutory charges in connection with their registration. These are:—

- (a.) Stamp Duty of 2s. 6d. for each £50 of the amount of mortgage up to £300; and
- (b.) A registration fee of 5s. for each Conditional Purchase or Homestead Farm Block mortgaged.

The Leases or Occupation Certificate, as the case may be, together with the above fees, must be in the possession of the Bank before a mortgage can be prepared.

NOTICES OF APPROVAL are insufficient for this purpose.

Intending borrowers are requested to note that no advances except for the specific purposes of discharging liabilities, or for purchasing breeding stock, are made against improvements effected prior to date of application. Applications should, in every instance, be lodged prior to commencement of work, and moneys are then paid over in progress payments as the work proceeds.

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2. Conditional Purchase Lands.—From 100 acres to 1,000 acres at from 10s. per acre, payable in 40 half-yearly instalments at the rate of 3d. per acre. Conditions: Personal residence for 5 years, one-tenth of boundaries to be fenced within two years, the whole within 5 years, and improvements to the full value of purchase money to be made within 10 years. Half the value of boundary fence may be allowed in estimating value of improvements. Conditional Purchase Lands may also be selected without the condition of residence, in which case the improvements in value must equal one and half the amount of the purchase money, but not exceeding £1 10s. per acre.

3. Land for Orchards, Vineyards, or Gardens, from 5 to 50 acres, from 20s. per acre, payable in three years. Improvements, including fence, to be completed in three years.

4. Full particulars as to conditions, areas, and further methods of obtaining land will be found in the pamphlet "Selector's Guide," obtainable on application to the undersigned.

5. Surveys are carried out by the State at half cost to selectors.

6. The Agricultural Bank renders monetary assistance to enable settlers to effect improvements when land has been substantially fenced.

7. On a selector proceeding to any district for the purpose of selecting land, the nearest Land Agent will supply all information, plans, and pamphlets, as well as a guide to conduct him to available land free of charge. In the event of an application for land being made, with the necessary deposit, a refund of railway fare may be obtained, if the deposit on land selected is equal to 50 per cent. more than the amount of the fare, and provided the application for refund is supported by a certificate from a Government Land Agent stating the place from which the selector proceeded for the purpose of selecting.

8. The Railway Department grants a special concession in the way of fares and freights for a new selector's family and goods, on production of a certificate of *bona fides* from the Lands Department. Any selector of an area of not less than 500 acres first-class land may obtain from the Lands Department an order for railway tickets and freight for his family, goods, and chattels, from the station nearest his present or late residence to the station nearest the land selected, the amount to be repaid to the Department by the selector by bills at 12 and 24 months, with 5 per cent. interest added; until the bills are paid the land cannot be transferred or mortgaged except to the Agricultural Bank.

9. Any new selector residing on his land can arrange passages for his wife and family to this State through the Colonial Secretary's Department.

10. Agencies are established at Menzies, Coolgardie, Kalgoorlie, Southern Cross, Cue, Northampton, Geraldton, York, Northam, Beverley, Newcastle, Bunbury, Katanning, Albany, Bridgetown, Busselton, Narrogin, Wagin, Pingelly.

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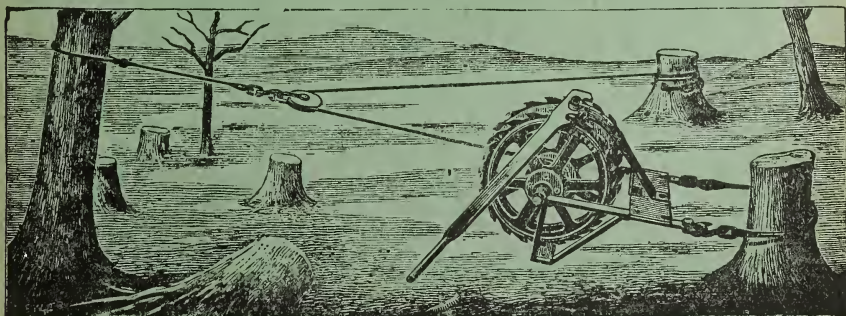
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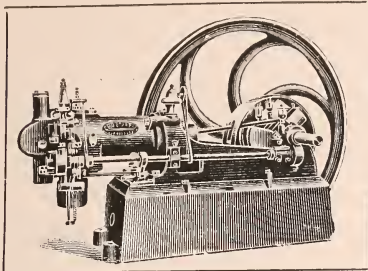
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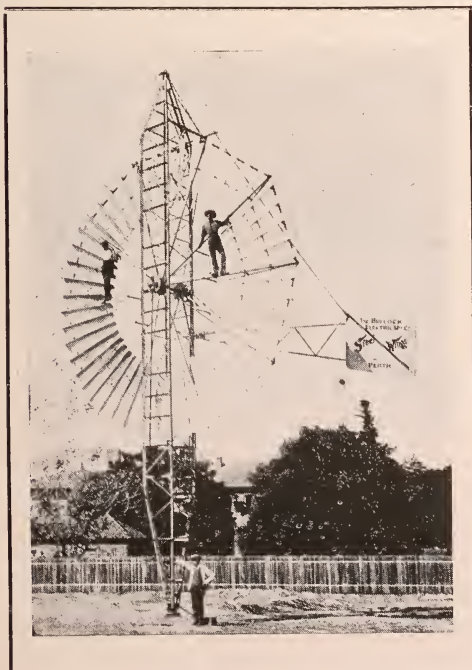
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JULY.

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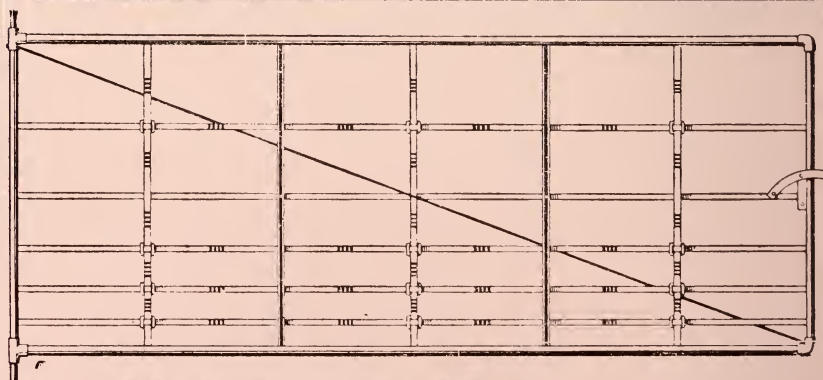
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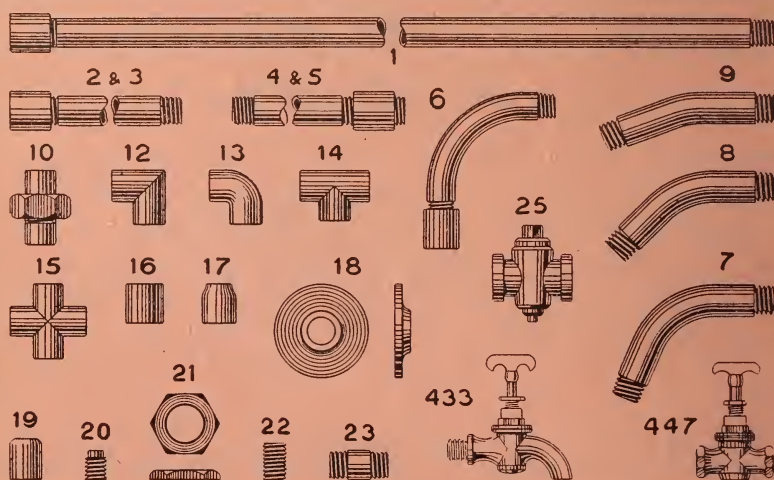
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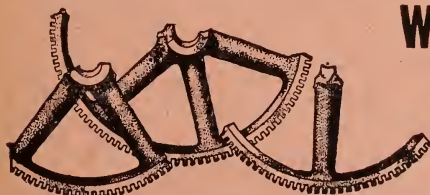
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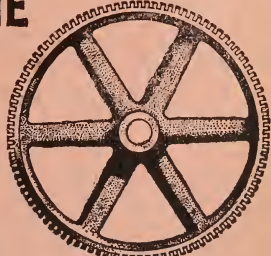
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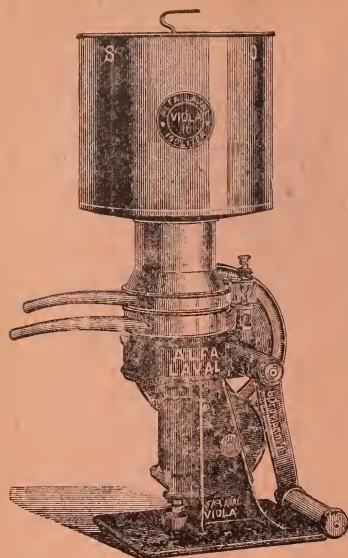
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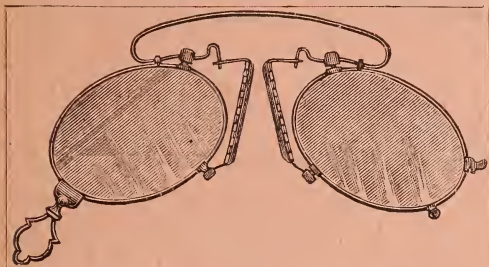
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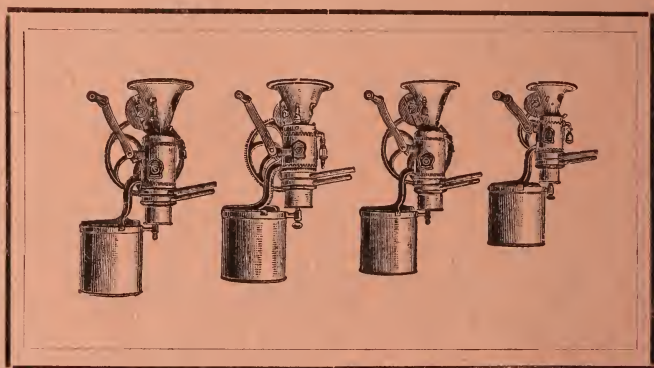
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"NEPTUNE UNRIVALLED" 12½-g. ...	1,140lb.	1,430yd.	£19	23/5 26/3
ORDINARY GALVANISED 8-g. ...	1,125lb.	*528yd.	£10	33/4 40/10
"NEPTUNE UNRIVALLED" 14-g. ...	730lb.	2,240yd.	£20	15/4 17/1
ORDINARY GALVANISED 10-g. ...	720lb.	*816yd.	£10 10/-	22/8 27/9

Two of the many testimonials we receive:—

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JOURNAL
OF THE
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OF
WESTERN AUSTRALIA.

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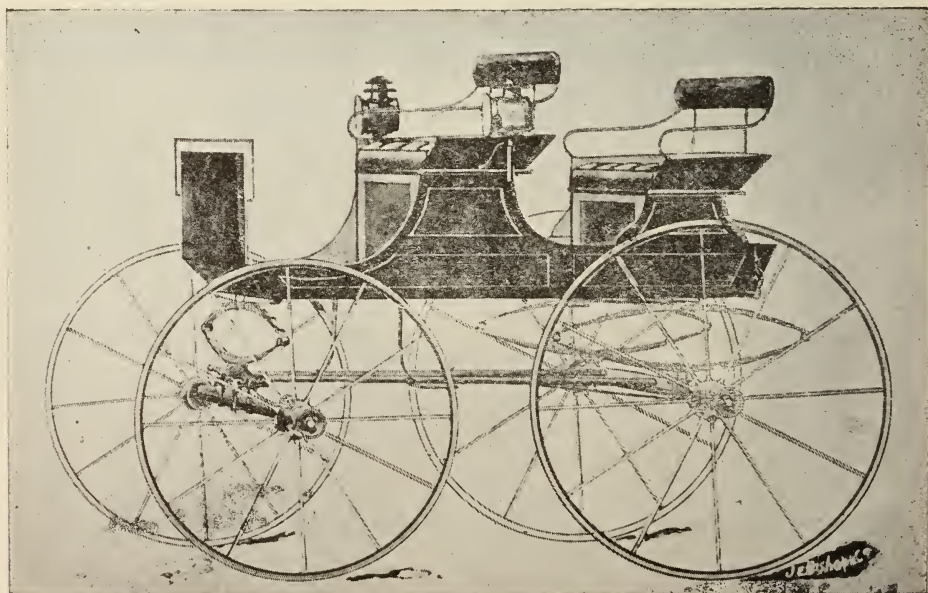
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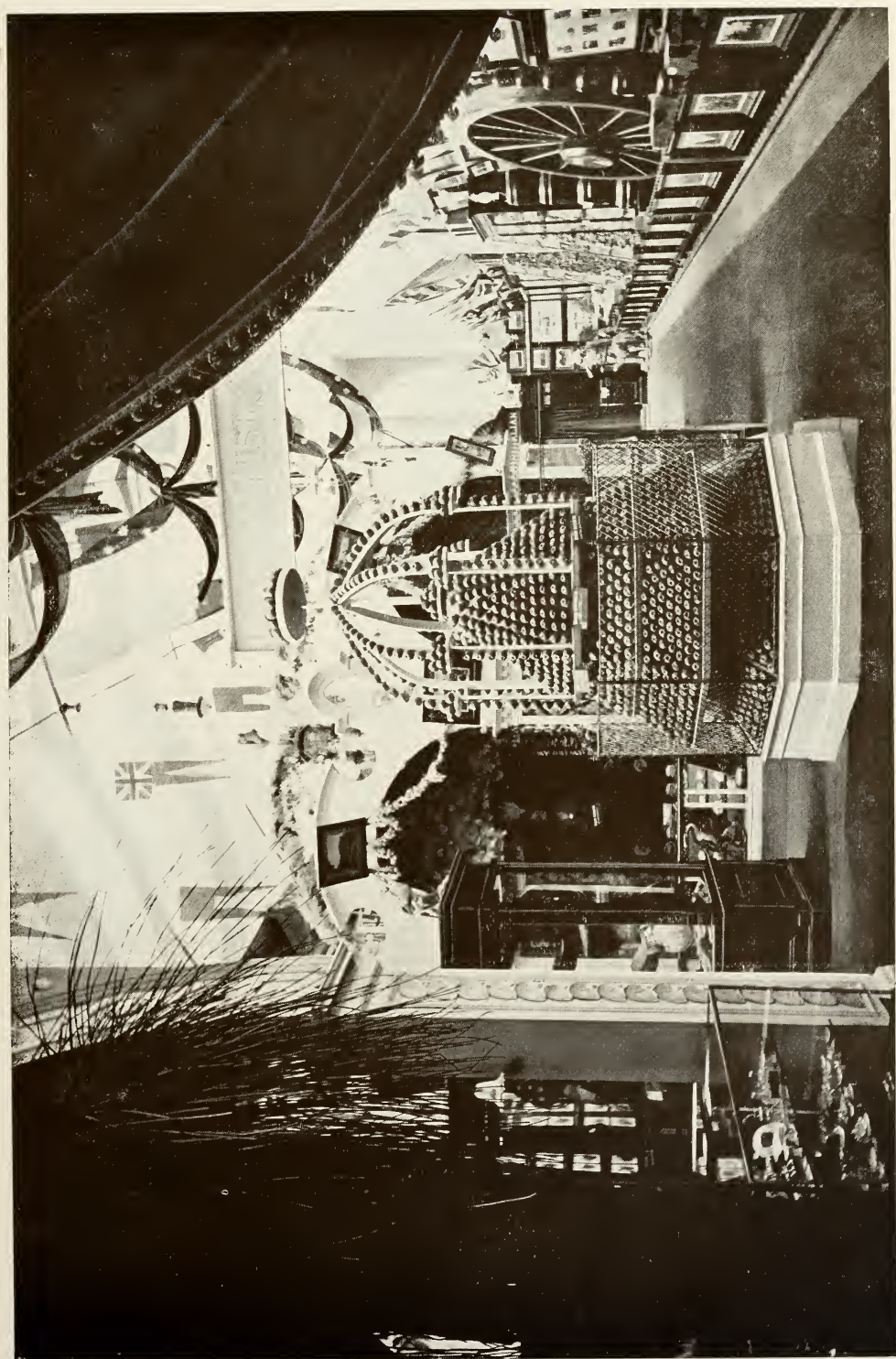
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WESTERN AUSTRALIAN COURT, FRANCO-BRITISH EXHIBITION. — General View from Main Entrance.



JOURNAL
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OF
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NOTES.

For Poor Clay Soil.—Two things are necessary for the improvement of poor clay lands: a phosphatic manure and a clover plant.

Co-operative Egg Societies.—In Germany great stimulus has been given to the poultry industry by the successful formation of co-operative associations for the sale of eggs. In 1907 there were 314 of these associations, besides a number of societies not exclusively egg societies.

Pigs as Pest Destroyers.—Apples possess a special value for fattening pigs. The destruction of insects by pigs, in consuming fallen apples, is a point worth consideration. Pigs should be allowed in the orchard from the time the fruit begins to fall until the crop has been gathered.

Pig-feeding.—In feeding hogs (says *Kansas Farmer*) two kinds of grain mixed together will give better gains than either feed alone. Wheat will make as many pounds of gain as corn (maize), but the pork has a dingy colour and shrinks badly in cooking. Grinding or soaking the grain whole will increase the feeding value about 10 per cent. provided the ground grain is fed in a thick slop.

Enquiry for Blackboy Gum and Mallet Bark.—Mr. Arthur H. Shaw, of 40 Pitt Street, Sydney, enquires as to the possibilities of obtaining supplies of Blackboy gum and Mallet bark. Mr. Shaw states that he can find a market for yellow No. 1 grade of Blackboy gum, in lumps and free from dirt, and also No. 2 grade, that is, powdered or small and slightly dirty. He would be glad to receive samples and prices f.o.b. Fremantle. He also asks about Mallet bark with good analysis.

Honey from Prickly Pear.—Mr. G. Butler, writing to the Queensland Department of Agriculture, describes the prickly pear as one of the best honey-producers for building up the colonies as it yields pollen and honey in large quantities. The honey is as white as that produced from lucerne, with a distinct flavour of its own. It has granulating properties, but it is considered that it would be a honey of first merit for selling in brick form as it will remain solid at a temperature of 100deg. Fahr.

Australia's great Competitor.—During last year over 1,000 miles of railway were constructed in Argentina. Concessions were granted for building over 3,000 miles more. That country is becoming a network of railways. The competition has led to low freights and great comfort in travelling. The earnings of the lines increased 20 per cent. in spite of the fact that the preceding year marked a big increase over 1906. The earnings were £20,278,000; net profit £8,004,600, or over 5 per cent. on the capital invested, which is mostly British, £157,792,883.

Potato-growing in the South-West.—The suitability of the ironstone gravel country of the South-West for potato-growing is demonstrated by some splendid specimens of "Factors," which have been forwarded to the Minister for Lands and Agriculture (Hon. James Mitchell) by Mr. F. Walsh, of Greenbushes. In a covering letter Mr. Walsh states that the only manure used was a light dressing of potato manure (Mt. Lyell) and a little horse manure. Some of the potatoes were fit for digging eight weeks from planting. He had experimented with various manures and potatoes in the ironstone gravel country, and had found the above mixture of manure the best and "Factors" the most successful variety of potatoes.

The Department's Library and Museum.—Many readers of the *Journal* appear to be unaware that the Department possesses a valuable library of standard works on agricultural, botanical, entomological, and other subjects of interest to the settler. The volumes number nearly 1,400, besides a great number of pamphlets and leaflets from many parts of the world. These are accessible to visitors who can peruse them on the spot. In combination with the library, there is also a reading room where journals and other periodicals of kindred character from different States and countries are filed for use of the public. Another attractive feature is the museum situated on the ground floor of the offices, where also the Information Bureau will be found under the charge of Mr. Fry of the Lands Department.

Deniliquin Stud Park Flock.—Undoubtedly one of the most famous stud flocks in Australia at the present time is that owned by Mr. Thos. Millear at Deniliquin Stud Park, New South Wales. In corroboration of this statement attention need only be drawn to the splendid exhibit of wool at the Franco-British Exhibition, London, last year, from Mr. Millear's Wanganella Estate, and which was described by Mr. S. B. Hollings, the celebrated wool expert of Bradford, as "perfect"; and to the fact that the highest price obtained for a merino ram during the past twelve years was paid for the famous sheep "Donald Dinnie," whose photograph appears on another page. Quibell's Dips have been used on Mr. Millear's celebrated flocks for many years with pronounced success.—[Advt.]

The Composition of Rain.—Rain contains nitrogen and oxygen gases dissolved from the atmosphere; carbonate of ammonia, carbonic acid gas, chlorides, sulphates and nitrates of soda, lime and ammonia, all in extremely small quantities. To speak generally, rain is not absolutely pure, as it is in a measure contaminated by the impurities of the atmosphere. In the Rothamsted Memoirs we find that the total nitrogen brought down by rain during three years was found to average 6.84lbs. per acre, "equivalent to 46½lbs. of ordinary nitrate of sodium." Carbonic acid in solution acts as a solvent upon the mineral matter in the soil and enters the circulation of the plant as carbonates, together with other soluble salts derived from the soil or the rain.

To Grow Lucerne successfully.—Among things to be avoided, if one expects to succeed with lucerne, are wet soil, sour soil, shallow soil, adulterated seed, dodder-infected seed, seed of poor vitality, seed from warmer, irrigated lands, and weed seeds in the soil. Factors that aid in securing good yields are thorough preparation of the soil, usually best begun the year before by planting a cultivated crop to which a liberal application of stable manure is made, and good dodder-free seed, usually sown without a nurse crop, and put in after weed seeds have been worked out of soil. In most cases the use of half a cwt. to a cwt. of lime to the acre, and of 200 to 300 pounds to the acre of soil from a successful lucerne field, will prove profitable and one or the other often changes a failure to a success.—*Bulletin 305, Geneva-New York Experimental Station.*

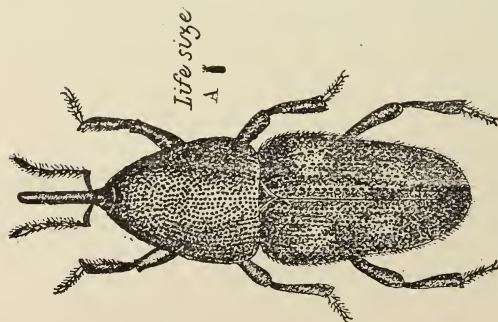
Value of Humus.—Professor H. Hume says:—"The practice of keeping the ground on which the orange grove stands perfectly free from herbage and thoroughly cultivated throughout the whole season, year in and year out, has been indulged in by many and is still followed by some. This practice has little to recommend it. A soil so treated soon becomes depleted of its natural fertility and the humus soon becomes used up through constant cultivation and the application of various fertilisers. No amount of fertiliser will do the work it should if the soil once loses its natural body and becomes deficient in humus. In spite of every effort in the line of fertilising, such a soil will become poor and infertile and the trees will soon show the effects in their unhealthy condition, and the owner will realise it in his diminishing returns. . . . Humus, one of the most, if not the most, important ingredient in any fertile soil, is generally found in inadequate amounts in citrus soils, and any system of cultivation which does not tend to increase the amount or maintain a considerable quantity of this substance in the soil is not based upon scientific principles."

Potato Drying.—The experiment in drying potatoes under the auspices of the German Imperial Department has had such good results that an important new field of activity may be offered for German farmers. The potatoes are reduced by this process to about one-fourth their original weight, and can be kept in good condition in the compressed form for an indefinite period. This fact also should bring about a corresponding reduction in the cost of freight with an increase of export. There are about 200 drying establishments already working with an output of three to four million cwt. and a total capacity up

to five million cwt. per annum. There are about fifteen machinery firms in Germany turning out suitable drying machines. Much value is attached to dry tubers as cattle food.—*British Trade Journal*.

Beneficial Parasites.—Mr. E. K. Carnes, Superintendent of the State Insectary, California, in a letter to Mr. Geo. Compere, addressed care of the Western Australian Department of Agriculture, writes:—"We are shipping about 75 to 100 colonies of parasites per day from the new insectary. Supplied a few hundred colonies of codlin moth parasites. I am not worrying about it (the parasite), for I feel that it will yet prove its character. The best authorities in the world claim that it will take at least five years to establish ichneumonidae of any cost. In Dr. Howard's report in the Entomologist for 1908 he states that the most wonderful thing met with was the abundant parasitism of red scale in Southern California hitherto not known to be parasitised. We have from 50 to 100 visitors to the insectary every day, and it is getting to be very popular. We ship more parasites in a week now than we used to in a year. The material from China has yielded several species of parasites on red and purple scales."

Fruit and Vegetable Evaporation.—Mr. G. Roeger, of Klemzig, South Australia, has forwarded to the Department samples of fruits evaporated by a process introduced by him in that State. An illustrated catalogue which accompanies Mr. Roeger's letter, gives views of the evaporator and machinery, which are patented and manufactured by the patentee. In describing the method of preserving it is claimed that the evaporation does not deprive the products of natural flavour or aroma, and that all fruits and vegetables evaporated by the Roeger machines will, if again given back the water which has been taken from them, regain their original freshness and crispness and be almost impossible to detect from fresh after being boiled. The machines are in three sizes: 4ft. x 2ft.; 5ft. x 2ft.; and 6ft. x 2ft. trays; length, 45ft. 9in.; height, 18ft.; width, 4ft. 11in., 5ft. 11in., and 6ft. 11in. over furnace plate. Each contains 15 trays.



Wheat Weevil (*Calandra oryzae*), greatly enlarged. A.

A. Life size.

LANDS ON THE MIDLAND RAILWAY.

OPINIONS OF THE DIRECTOR OF AGRICULTURE.

During the latter part of June the Director of Agriculture made a visit of inspection to the country in the vicinity of Moora and Yatheroo, on the Midland line of railway. Speaking of his impressions of the districts the Director says:—

“I was very glad to find so many well-developed and skilfully-equipped farms in the district. I left the Midland Company's line at Koojan, where Mr. Padbury has a very large area under wheat and other cereals. His crop throughout was looking healthy and promising, but what particularly took my attention with quite a number of the farms in the Moora district was the way in which they were improved. The value of carefully considered water conservation work seemed to be more appreciated in that district than in any other that I have yet visited. Large dams distributed over their properties, and, as it happened full to the brim, would relieve all anxiety which might arise from a long continued summer, and many of those dams had either a windmill pumping plant on them for pumping the water to troughs, or the water was led by gravitation to troughs situated at lower levels. Mr. Roberts, of Yatheroo, in most of his dams has adopted the latter practice. It saves the water from being puddled and fouled by stock coming down to drink at it, and where this provision can be made and the dam fenced off it saves the water and is a great deal healthier for the stock, as dams to which stock have access can become ugly means of spreading disease if, perchance, the stock drinking the water or wading in it are unhealthy. In driving from Koojan to Moora one sees a nice stretch of useful all-round agricultural land—the kind of land on which a combination of wheat and sheep can be very profitably worked. It is not likely that much will be gained by endeavouring after artificial grasses in such country, but a very great deal will be gained in the carrying capacity of the native forages by a generous use of phosphates with the wheat following systematic early fallowing.

“Going to Yatheroo from Moora, I was simply astonished at the wealth of feed that estate is carrying at the present time. On the limestone blocks the herbage is as dense as it can grow, and looks at this time of the year much as some of the best pastures in New Zealand look in the month of December, only there is native herbage there as distinguished from the artificial grasses of the Dominion. It is no exaggeration to say that the density of bottom in the herbage was equal to that which would be on land in the Canterbury plains worth £40 to £50 per acre. Of course, the want of distribution in the rainfall takes a very big slice off the face of that value in the case of Yatheroo, but at the same time I have seen no spot in Western Australia sweating its very fatness in fertility as some of the choicest blocks of Yatheroo seem to do. It is unfortunate that this property is but an oasis standing out of a vast area of second-rate and third-rate country.

“From Yatheroo we came back to Moora, and after lecturing there I went on to some of the country east of the line and came through the usual alternating conditions—belts of very useful timbered country suitable for farming,

and belts of grazing country, some of which may be farmed but the worst of which will continue to be grazed for what they are worth. It occurs to one going through the district that some of the lighter land can be developed by sowing forage crops for sheep, such as mixtures of ryecorn, rape, white mustard, sand vetches, Dun oats, or Cape barley, mixed according to the opportunity of the farmer and dressed with, say, 80lb. to 100lb. of superphosphate for each crop. It is a mistake, I reckon, to take a crop off some of that light land, for I fear that the same results would follow as were consequent upon cropping some of the very lightest turnip land in New Zealand, viz., that the cropping exhausts such land, so that it will not carry feed. Growing crops and feeding down season after season is the game, and every year the land is getting better by the treading of the sheep and by the increased organic matter coming into it through the roots and from the droppings of the sheep. Such land, if once freed of the scrub and rubbish on it, can be easily worked. In fact, I think that after several years in succession of crops fed down, such land could be sown without the use of a plough, simply rooting it up with a cultivator, harrowing it down to a seed-bed, putting on a mixture of seeds and manure, and allowing nature to do what it will. After a few years of this practice I would hazard the opinion that that land would carry the usual sheep feed, in the form of dandelion, possibly a little geranium, and a fair sprinkling of trefoil—good feed whether green or dry. The important consideration if that practice is to be taken up by anyone is to be generous with his phosphates, and on land so cheap, if fair grazing results can be had, I do not think that a couple of hundredweight to the acre would be found extravagant practice.”

In conclusion the Director said he considered the district was very fortunate in having so many enterprising settlers within its boundaries—men who were keen to keep themselves abreast with the very latest methods which made for success. That fact he had seen evidenced again and again in the improvements previously mentioned, in the quality of the stock carried on the farms, in the commodious outbuildings, and in the up-to-date implements carefully looked after and sheltered in well-designed sheds.

NEW LUCERNE PEST.

*Reference, indicative of some concern, is made in the *Agricultural Gazette of New South Wales* for June, to the appearance of a new pest which has badly infested the lucerne in the Tamworth district in that State. As lucerne seed is imported from the East the information contained in the article will no doubt be of value to settlers in Western Australia.

The insect is described as a small chalcid wasp which, in the larval stage, feeds on the interior of the seed capsule of the lucerne where it pupates; emerging through a small hole it bores in the side just when the seed is fit for gathering. The seed becomes useless for sowing and that means a considerable loss to growers.

The identity of the insect has not yet been determined, but it is evidently closely allied to, if not identical with, a seed-eating chalcid, *Brachophagus funeleus*, well known in the United States as infesting the seeds of red clover and lucerne, and has also been recorded from other parts of the world. It could easily have been introduced into Australia by imported seed.

It is intended to study the life history of this wasp in order to discover the most effective means to check it, and it is suggested that the infected crop should be cut early in order that the larvæ may not have time to develop, and to obtain seed from the succeeding crop.

The adult wasp is a tiny, shining, black creature, only $\frac{1}{8}$ of an inch in length, with light-coloured legs and transparent wings. Its presence has to be searched for very carefully.

TROPICAL CULTIVATION.

MR. DESPEISSIS' DEPARTURE FOR THE NORTH-WEST.

The first practical step in the development of the North-West for tropical cultivation has been taken by the Government in appointing Mr. A. Despeissis, the Under Secretary of the Department of Agriculture, Commissioner of Tropical Cultivation, an entirely new official creation. The new Commissioner took his departure for the far north on the 10th instant in the s.s. "Burrumbidgee" and will make Derby his headquarters, and whence he will proceed to carry out the intentions of the Government by initiating experiment stations and distributing the seed of tropical products to settlers in various localities. Mr. Despeissis will break his journey at Carnarvon, and spend a short time at that point.

Prior to his departure Mr. Despeissis was tendered a farewell by officers of the Department in the lecture room of the building, a good muster being present. Mr. T. S. McNulty, acting Under Secretary, presided and expressions of personal goodwill and wishes for the success of his labours were tendered to the Commissioner by several speakers, to which Mr. Despeissis responded in a feeling manner. A letter was read from the Minister, Hon. Jas. Mitchell, referring in high terms to the valuable work Mr. Despeissis had rendered to the State and to the Department during the time he had filled the post of Under Secretary.

Mr. Despeissis will commence his investigations at Carnarvon, and will thence proceed overland through the settled portions of the North-West to Derby, calling *en route* at Onslow, Roebourne, Port Hedland, and Broome. He does not expect to return to the city before the end of the year, and at the conclusion of his investigations he will submit a full report to the Government. He was commissioned to make investigations as to the conditions both favourable and unfavourable under which agriculture can be developed in the warmer provinces of the State. The subjects of inquiry will include climatic conditions, character of the soils, comprising geological formation, physical conditions of the land, swamps and soaks, and the value of the water

for both stock and irrigation purposes, and trees, shrubs, and grasses indicative of the soils and climatic conditions. He will also ascertain what kind and quantity of fencing and building material are available, and will interview settlers as to their experiences in the growing of crops and trees, and make notes on the methods employed and time of sowing and planting, and the mistakes to be avoided. Generally he will make inquiries into the cost of production, the yields, the labour question, the conditions of life, land transport, roads and road-making, and transport by sea. In the course of his investigations it will be his duty to pay attention to such matters as diseases in stock, pests, and vegetation, and generally ascertain what the prospects are for an early development of portions of the North-West by the cultivation of tropical fruits, fibres, and oils and other tropical products of which this State imports £485,000 worth per year.

THE FERTILISER ACT.

RESULT OF ANALYSES.

By PETER G. WICKEN, Inspector of Fertilisers.

It is now three years since the Fertilisers and Feeding Stuffs Act was put into force in this State, and in previous years lists of the results of the analyses of all the fertilisers offered for sale in this market were published in the *Journal*. Last year, owing to the absence of the Inspector in London, hardly any samples were taken and no results published. This season samples of nearly all the fertilisers offered for sale have been obtained, and the results of the first lot of analyses to hand are published herewith, as found by the Government Analyst.

Taken altogether the results show that the fertilisers offered for sale are mostly up to the registered standard, although a few of the results show considerable variation.

The list is not complete, and a supplementary list will be published in the next issue of the *Journal*.

REGISTERED BRANDS.

The following is the schedule of brands of fertilisers which have been registered with the Department of Agriculture, and all purchasers should ascertain that the brand is registered before they purchase it:—

Messrs. Elder, Shenton, & Co., Fremantle—"Elder."

Mr. R. Forrest, Bunbury—"Eclipse."

Mr. W. R. Haynes, Perth—"Haynes B.B."

Mr. W. R. Haynes, Perth—CWS in triangle.

Mr. W. R. Haynes, Perth—"Top brand."

Messrs. Fallowfield & Co., Geraldton—"Abrolhos."

Messrs. Felton, Grimwade, & Bickford, Perth—"Mimosa."

- Messrs. Paterson & Co., Fremantle—P. over B.B. in triangle.
 Messrs. Hayward & Son, Bunbury—H. & S.
 Messrs. Hayward & Son, Bunbury—"Magic."
 Messrs. Wigmore & Co., Fremantle—"Sickle."
 Messrs. Gardner Bros., Perth—ML in diamond.
 Messrs. Gardner Bros., Perth—G.B.
 Messrs. Gardner Bros., Perth—"Cockbill."
 Messrs. Gardner Bros., Perth—"Star."
 Messrs. Gardner Bros., Perth—"Paragon."
 Messrs. Gardner Bros., Perth—"Fitzroy."
 Messrs. Binney & Son, Welshpool—"Swan."
 Messrs. Couche, Calder, & Co., Welshpool—"Crown."
 Messrs. J. M. Drummond & Co., Perth—L & Co.
 Messrs. J. M. Drummond & Co., Perth—J. M. D. & Co.
 Messrs. J. M. Drummond & Co., Perth—H over AB over 5028 in cross
 over Perth.
 Messrs. Dalgety & Co., Fremantle—"Albatross."
 Messrs. Dalgety & Co., Fremantle—"Dalgety."
 The W.A. Producers' Union, Perth—"W.A.P.U."
 The W.A. Producers' Union, Perth—"Union."
 The W.A. Producers' Union, Perth—"Scotia."
 The W.A. Producers' Union, Perth—"Producers."
 Messrs. G. Wills & Co., Fremantle—"Globe."
 Messrs. Barrow & Co., Fremantle—"Nitro, Barrow, & Co."
 Messrs. Forrest, Emanuel, & Co., Fremantle—"Forrest, Emanuel, & Co.,
 B.B.G."
 Messrs. Forrest, Emanuel, & Co., Fremantle—"Forrest, Emanuel, & Co.,
 Bone Manure."
 Messrs. Forrest, Emanuel, & Co., Fremantle—"Forrest, Emanuel, & Co.,
 Blood Manure."
 Messrs. Forrest, Emanuel, & Co., Fremantle—"Forrest, Emanuel, & Co.,
 B. & B. Manure."
 Messrs. Forrest, Emanuel, & Co., Fremantle—"Forrest, Emanuel, & Co.,
 Bonedust."
 Mr. W. Padbury, Guildford—"Peerless."
 Mr. R. Bates, Kalgoorlie—"Bates."
 Messrs. Ockerby, Lehman, & Co., Fremantle—"Apollo."
 Mr. C. H. Newman, Albany—"Champion."
 Messrs. Wing, Sang, & Co., Perth—Cross in diamond.
 Messrs. Wilshire & Feeley, Fremantle—"B. & B. over W. & F."
 Messrs. Wilshire & Feeley, Fremantle—"B.B."
 Department of Agriculture, Perth—"W.A. over D, broad arrow A in dia-
 mond over Cave Guano."
 Mr. Kie Haw, Perth—"K.H. over F."
 Messrs. Gardner Bros., Perth—"A.W.X."
 Mr. W. K. Smith, Albany—S. in diamond.
 Messrs. E. Barnett & Co., Albany—"I.X.L."
 Messrs. Drew, Robinson, & Co., Albany—"St. George."
 Messrs. T. Kitchen & Son, Perth—"Waddell."
 Messrs. T. Kitchen & Son, Perth—"Kensington."
 Messrs. J. R. Walters & Co., Bridgetown—"P.T.O."

ANALYSES OF FERTILISERS.

In exercise of the powers vested in him by Section 16 of "The Fertilisers and Feeding Stuffs Act, 1904," the Hon. the Minister for Lands and Agriculture has directed that the following Analyses of Fertilisers, made by the Government Analyst, be published for general information.

24th June, 1909.

T. S. McNULTY,
Acting Under Secretary for Agriculture.

Analyses of Fertilisers.

	No. of Sample.	Name of Fertiliser and Brand.	From whom obtained.	Nitrogen.	Water Soluble Phosphoric Acid.	Citrate Soluble Phosphoric Acid.	Acid Soluble Phosphoric Acid.	Total Phosphoric Acid.	Potash.
Guaranteed Analysis ..	264	Thomas "Scotia "	Producers' Union ..	..	..	..	14.0	14.0	..
Found by Gov. Analyst	..	..	..	..	..	..	14.35	14.35	..
Guaranteed Analysis ..	265	S.B.P. Manure "Swan "	Binney & Son ..	..75	..	..	12.0	12.0	2.0
Found by Gov. Analyst	..	..	..	..98	..	..	12.96	12.96	2.79
Guaranteed Analysis ..	266	Bonedust, "Swan "	Binney & Son ..	2.75	..	..	18.3	18.3	..
Found by Gov. Analyst	..	..	..	3.26	..	..	20.01	20.01	..
Guaranteed Analysis ..	267	Blood Manure, "Swan "	Binney & Son ..	7.50	..	..	..	..	..
Found by Gov. Analyst	..	..	..	8.57	..	..	..	..	..
Guaranteed Analysis ..	268	Sulphate of Potash, "Crown "	Couche, Calder, & Co.	..	..	..	..	..	47.0
Found by Gov. Analyst	..	..	..	..	..	..	..	..	49.0
Guaranteed Analysis ..	269	Superphosphate, "Sickle "	Couche, Calder, & Co.	..	17.0	1.0	2.0	20.0	..
Found by Gov. Analyst	..	..	..	..	14.28	1.53	3.68	19.5	..
Guaranteed Analysis ..	270	B.B.P., "Crown "	Couche, Calder, & Co.	1.0	.50	4.0	7.0	11.50	2.0
Found by Gov. Analyst	..	..	..	.61	6.37	5.97	4.86	17.20	2.65
Guaranteed Analysis ..	271	Thomas Phosphate, "Globe "	Couche, Calder, & Co.	..	..	..	14.0	14.0	..
Found by Gov. Analyst	..	..	..	..	..	..	14.8	14.8	..
Guaranteed Analysis ..	272	Muriate of Potash, "Crown "	Couche, Calder, & Co.	..	..	..	..	..	30.0

Found by Gov. Analyst Guaranteed Analysis ..	273	.. .. Sulphate of Ammonia, "Crown"	.. .. Couche, Calder, & Co.	.. .. 20-0	.. ..	.. ..	.. ..	.. ..	30-01
Found by Gov. Analyst Guaranteed Analysis ..	274	.. .. Sulphate of Potash, "G.B."	.. .. Gardner Bros.	.. .. 20-51	.. ..	.. ..	.. ..	.. ..	51-80
Found by Gov. Analyst Guaranteed Analysis ..	275	.. .. Sulphate of Ammonia, "G.B."	.. .. Gardner Bros.	.. .. 20-0	.. ..	.. ..	.. ..	.. ..	50-63
Found by Gov. Analyst Guaranteed Analysis ..	276	.. .. Blood Manure, "G.B."	.. .. Gardner Bros.	.. .. 19-88	.. ..	.. ..	.. ..	.. ..	1-28
Found by Gov. Analyst Guaranteed Analysis ..	277	.. .. Bonedust, "Cockbill"	.. .. Gardner Bros.	.. .. 8-16	.. ..	.. ..	.. ..	.. ..	1-07
Found by Gov. Analyst Guaranteed Analysis ..	278	.. .. No. 1 Superphosphate, "M.L."	.. .. Gardner Bros.	.. .. 5-69	.. ..	.. ..	.. ..	.. ..	18-3
Found by Gov. Analyst Guaranteed Analysis ..	279	.. .. Nitro Superphosphate, "M.L."	.. .. Gardner Bros.	.. .. 1-60	.. ..	.. ..	.. ..	.. ..	17-86
Found by Gov. Analyst Guaranteed Analysis ..	280	.. .. Nitrate of Soda, "M.L."	.. .. Gardner Bros.	.. .. 1-82	.. ..	.. ..	.. ..	.. ..	2-0
Found by Gov. Analyst Guaranteed Analysis ..	281	.. .. Orchard Manure, "M.L."	.. .. Gardner Bros.	.. .. 15-67	.. ..	.. ..	.. ..	.. ..	18-70
Found by Gov. Analyst Guaranteed Analysis ..	282	.. .. Thomas Phosphate, "Star"	.. .. Gardner Bros.	.. .. 1-20	.. ..	.. ..	.. ..	.. ..	16-0
Found by Gov. Analyst Guaranteed Analysis ..	283	.. .. Kainit, "G.B."	.. .. Gardner Bros.	.. .. 2-18	.. ..	.. ..	.. ..	.. ..	16-73
Found by Gov. Analyst Guaranteed Analysis ..	284	.. .. Potash Manure, "G.B."	.. .. Gardner Bros.	.. .. ..	.. ..	.. ..	.. ..	.. ..	..
Found by Gov. Analyst Guaranteed Analysis ..	285	.. .. Potato Manure, "M.L."	.. .. Gardner Bros.	.. .. ..	.. ..	.. ..	.. ..	.. ..	15-42
Found by Gov. Analyst Guaranteed Analysis ..	286	.. .. B. & B. "Paragon"	.. .. Gardner Bros.	.. .. 1-32	.. ..	.. ..	.. ..	.. ..	15-0
Found by Gov. Analyst Guaranteed Analysis ..	..	.. .. ..	.. .. ..	.. .. 5-92	.. ..	.. ..	.. ..	.. ..	15-94
Found by Gov. Analyst Guaranteed Analysis ..	..	.. ....	.. ....	.. ....	.. ..	.. ..	.. ..	.. ..	..
Found by Gov. Analyst Guaranteed Analysis ..	..	.. .. ..	.. .. ..	.. .. ..	.. ..	.. ..	.. ..	.. ..	13-0
Found by Gov. Analyst Guaranteed Analysis ..	..	.. .. ..	.. .. ..	.. .. ..	.. ..	.. ..	.. ..	.. ..	13-98
Found by Gov. Analyst Guaranteed Analysis ..	..	.. .. ..	.. .. ..	.. .. ..	.. ..	.. ..	.. ..	.. ..	30-0
Found by Gov. Analyst Guaranteed Analysis ..	..	.. .. ..	.. .. ..	.. .. ..	.. ..	.. ..	.. ..	.. ..	29-16
Found by Gov. Analyst Guaranteed Analysis ..	..	.. .. ..	.. .. ..	.. .. ..	.. ..	.. ..	.. ..	.. ..	2-16
Found by Gov. Analyst Guaranteed Analysis ..	..	.. .. ..	.. .. ..	.. .. ..	.. ..	.. ..	.. ..	.. ..	18-37
Found by Gov. Analyst Guaranteed Analysis ..	..	.. .. ..	.. .. ..	.. .. ..	.. ..	.. ..	.. ..	.. ..	16-0
Found by Gov. Analyst Guaranteed Analysis ..	..	.. .. ..	.. .. ..	.. .. ..	.. ..	.. ..	.. ..	.. ..	13-90

Analyses of Fertilisers—continued.

No. of Sample.	Name of Fertiliser and Brand.	From whom obtained.	Nitrogen.	Water Soluble Phosphoric Acid.	Citrate Soluble Phosphoric Acid.	Acid Soluble Phosphoric Acid.	Total Phosphoric Acid.	Potash.
287	Thomas Phosphate, "Elder"	Elder, Shenton, & Co.	..	..	..	14.0	14.0	..
288	Abrolhos Guano, "Abrolhos"	Dalgety & Co.	..	..	13.07	14.55 6.93	14.55 20.0	..
289	Bone Manure, "Dalgety"	Dalgety & Co.	3.0	..	6.04	21.32 15.0	27.36 15.0	..
290	Thomas Phosphate, "Albatross"	Dalgety & Co.	2.32	..	..	16.8 16.0	16.8 16.0	..
291	Nitrate of Soda, "Sickle"	Producers' Union	15.5	..	..	13.3	13.3	..
292	Sulphate of Ammonia, "Sickle"	Producers' Union	15.43 20.0	..	..	..	..	..
293	Sulphate of Potash, "W.A.P.U."	Producers' Union	20.8	..	..	..	..	52.0
294	Superphosphate, "Swan"	Producers' Union	..	14.0	1.83	2.74	18.57	52.26
295	Bonedust, "Producers"	Producers' Union	3.0	13.45	4.93	4.11	22.48	..
296	Thomas Phosphate, "Globe"	G. Wills & Co.	5.2	..	..	21.0	21.0	..
297	Bonedust, Cross in square	Wing, Sang, & Co.	3.75	..	..	13.35	13.35	..
298	B.B., "B.B."	W. Haynes & Co.	4.4 5.0	..	..	17.23 12.0	17.23 12.0	..
..	..	..	4.42	..	..	12.8	12.8	..

Guaranteed Analysis ..	299	C.W.S., C. over W.S. in triangle	W. Haynes & Co.	5.0	..	14.19	4.44	18.63	..
Found by Gov. Analyst	300	Sulphate of Ammonia, "Top brand"	W. R. Haynes	4.45	..	3.74	13.30	17.04	..
Guaranteed Analysis ..	301	..	..	20.0	..	..	..	..	..
Found by Gov. Analyst	302	Sulphate of Ammonia, "Mimosa"	Felton, Grimwade, & Co.	20.3	..	..	..	..	..
Guaranteed Analysis ..	303	Nitro Bone, "Swan"	J. M. Drummond	20.3	..	..	14.0	14.0	..
Found by Gov. Analyst	304	Superphosphate, "Union"	Producers' Union	2.50	..	..	23.07	23.07	..
Guaranteed Analysis ..	305	..	..	3.9	16.0	..	..	16.0	..
Found by Gov. Analyst	306	Kainit, "W.A.P.U."	Producers' Union	..	16.59	..	..	16.59	..
Guaranteed Analysis ..	307	Sulphate of Ammonia, "W.A.P.U."	Producers' Union	..	..	..	..	..	12.0
Found by Gov. Analyst	308	Bone Manure, "Globe"	G. Wills & Co.	20.58	..	..	11.0	11.0	..
Guaranteed Analysis ..	309	Sulphate of Potash, "Globe"	G. Wills & Co.	1.6	..	..	11.0	11.0	..
Found by Gov. Analyst	310	Nitrate of Soda, "Globe"	G. Wills & Co.	1.62	..	..	..	..	48.0
Guaranteed Analysis ..	311	Nitro Bone, "Nitro Barrow"	Barrow & Co.	..	..	..	..	..	52.0
Found by Gov. Analyst	312	Super Bone Manure, "Crown"	Couche, Calder, & Co.	15.54	..	3.64	12.04	15.68	..
Guaranteed Analysis ..	313	Potato Manure, No. 4 "Crown"	Couche, Calder, & Co.	2.60	..	5.72	11.14	16.86	..
Found by Gov. Analyst	314	..	..	3.36	..	4.5	8.0	16.5	1.25
Guaranteed Analysis ..	315	..	..	1.25	..	4.0	..	..	..
Found by Gov. Analyst	316	..	..	1.39	1.78	4.53	11.20	17.51	.776
Guaranteed Analysis ..	317	..	..	1.30	10.0	4.0	2.0	16.0	3.50
Found by Gov. Analyst	318	..	..	1.96	8.66	2.95	5.80	17.41	2.52
Guaranteed Analysis ..	319	..	..	3.0	10.0	2.0	..	12.0	7.0

Analyses of Fertilisers—continued.

No. of Sample.	Name of Fertiliser and Brand.	From whom obtained.	Nitrogen.	Water Soluble Phosphoric Acid.	Citrate Soluble Phosphoric Acid.	Acid Soluble Phosphoric Acid.	Total Phosphoric Acid.	Potash.
314	.. .. Ammoniacal "Crown"	.. .. Couche, Calder, & Co.	2.78	10.21	1.43	3.43	15.07	8.42
315	.. .. Nitrate of Soda, "Crown"	.. .. Couche, Calder, & Co.	1.0	..	6.0	15.0	21.0	..
316	.. .. Bonedust, "Crown"	.. .. Couche, Calder, & Co.	2.68	..	5.72	13.25	18.97	..
317	.. .. Union Manure, "Crown"	.. .. Couche, Calder, & Co.	15.36	..	..	..	..	..
318	.. .. B. & B., F. & E., B., & B.	.. .. Couche, Calder, & Co.	3.50	..	6.0	12.5	18.5	..
319	.. .. B. B. & G., "F. & E., B. & B. G."	.. .. Couche, Calder, & Co.	4.01	..	7.76	12.33	20.09	..
320	.. .. Bone Manure, "F. & E. Bone Manure"	.. .. Couche, Calder, & Co.	1.50	12.0	..	..	12.0	4.50
321	.. .. Blood Manure, "F. & E. Blood Manure"	.. .. Couche, Calder, & Co.	2.10	..	..	..	..	..
322	.. .. Bonedust, "F. & E. Bonedust"	.. .. Couche, Calder, & Co.	5.19	..	1.16	5.32	6.48	..
..	.. .. ..	.. .. ..	2.404	..	6.24	16.52	22.76	..
..	.. .. ..	.. .. ..	2.38	..	4.72	11.70	16.42	..
..	.. .. ..	.. .. ..	4.07	..	5.16	10.08	15.26	..
..	.. .. ..	.. .. ..	4.02	..	3.86	12.62	16.48	..
..	.. .. ..	.. .. ..	3.026	..	6.73	11.10	17.83	..
..	.. .. ..	.. .. ..	1.58	..	2.08	3.86	5.94	..
..	.. .. ..	.. .. ..	2.135	..	5.91	17.83	23.24	..
..	.. .. ..	.. .. ..	3.75	..	..	18.3	18.3	..
..	.. .. ..	.. .. ..	3.45	..	..	22.45	22.45	..



Perennial White Clover (*Trefolium repens perenne*).

CLOVERS. *

(JOHN M. BUTLER, Armadale.)

The West Australian farmer cannot know too much about trefoil or clover, and when he is able to distinguish quickly the different species growing in this State, and to note just as quickly the healthiness or the unhealthiness of any crop brought under his notice, either in his own paddock or the paddock of his neighbour, he will be adding to that fund of knowledge which spells profit at the season's end. Everyone knows the *Common Purple* or *Meadow Clover*, the *Trifolium pratense* of Linneas, but how many are able to identify it until it is in flower? The root is fibrous, mostly much branched at the crown, the stems are ascending, round or slightly angular, nearly smooth below, hairy above, and about a foot high. The leaves are alternate, distant, the lower ones on long slender foot-stalks, the upper ones being shorter, the three leaflets are on short partial foot-stalks, the shape is ovate or elliptic, the edges are entire or slightly toothed, often notched at the point, the mid-rib terminating in a point, paler below than on top; numerous fine lateral veins, nearly smooth or downy, the upper side mostly marked with a pale crescent-like spot. The stipules, or small leaflets on the leaf stem, are pale, membranous, acute, bristle-pointed, reticulated with coloured veins; the flower, or inflorescence, is terminal, solitary, round or ovate heads, sometimes in pairs, with very short flower stalk or peduncle. The calyx, the small green leaves at the base of the flower, is cylindrical, ten-ribbed (a common feature of the clover calyx) somewhat downy, the mouth surrounded with a ring of pale hairs and five bristle-shaped teeth, the lower one longest, erect when in fruit; the corolla, or flower, is dark purple, pink, and sometimes white; the petals of the corolla are all united into a tube; the legume, or seed pod, enclosed in the calyx is small, roundish and single-seeded. It is a perennial, that is, it grows, blooms, and seeds for several years.

This species of clover is the most valued of all the artificial grasses for agricultural purposes, whether for cutting while green or for making into hay, its produce being greater, and is more relished by cattle than any of the other species, and from experiments made upon it by Mr. Sinclair and others it appears to contain a greater proportion of nutritious material. It flourishes best in a dry light soil, in which the long ramifications of its roots can penetrate; in such situations in a dry season it produces the greatest quantity of seed, and if the season is a wet one, the bulk of produce is the greater; but whether under such circumstances it contains in proportion a greater quantity of nutriment, is a questionable matter. It is often sown with rye grass when it is intended to be cut for hay; and in many cases this mixture of grass and clover seems to answer to the grower better than when grown alone, especially if the soil is not very porous.

Trifolium medium, or Zigzag Clover.

The root is somewhat creeping, the stem ascending, mostly much branched, bent at each joint, round, smooth or clothed with soft hair. The leaves are

* The clovers illustrated are not described in this article.

provided with petioles or stalks; the leaflets have no stalks (sessile); elliptic, acute, or obtuse in shape, sometimes notched at the apex or top; the margin finely toothed, dark green above, paler below, and generally hairy; the mid-rib prominent; the lateral veins are minute and numerous. The stipules are lanceolate with a long linear point ribbed, with coloured veins and downy. The inflorescence is a terminal globe-like head of numerous loose flowers, elevated on a short or long peduncle or stalk. The calyx is cylindrical, ten-ribbed, smooth; the teeth bristle-shaped and hairy, the lower tooth much longer than the others; the mouth hairy. The corolla is a pale purple; the seeds are somewhat heart-shaped; it is a perennial.

The different habit of this species renders it a preferable plant for heavy soils, and its spreading roots enable it to resist long seasons of drought, hence it is that it flourishes better in a tenacious soil and is better suited for permanent pastures than *Trifolium pratense* or Common Purple. From the experiments, however, which have been made with it, and comparing the quantity of nutritious matter which it affords with that of *T. pratense*, it seems in all cases to be only about one-half, so that, however useful it may be in the circumstances above mentioned, it is not the species the farmer should select for a hay crop. It varies according to the situation of its growth, as to size and hairiness, and the heads are elevated upon short or long stalks, otherwise it is constant in its character.

Trifolium ochroleucum or Sulphur-coloured Clover.

The root is tapering; the stems, mostly several, ascending, from twelve to eighteen inches high, round, more or less branched, and clothed with short erect tawny hairs; the leaves are distant, the lower one alternate, with long foot-stalks, the upper pair of leaves opposite, the leaflets narrow, oblong, or lanceolate; the stipules lanceolate with a taper point, pale, membranous, striated with coloured ribs and slightly downy. The inflorescence is a terminal globe-like head of dense pale sulphur-coloured flowers elevated on a hairy stalk of greater or less length. The heads of the flowers are at first globe-like, but become oblong. The calyx is cylindrical, ten-ribbed, furrowed and downy; the teeth, five, unequal, the lower one much the longest and bent backwards (reflexed) when in seed; the legume is small, membranous, and contains one seed only, which is yellow. It is a perennial and very partial to light gravelly soil. This, as an agricultural plant, seems very inferior to the before-mentioned two species and is not cultivated intentionally to any considerable extent.

Trifolium maritimum or Teasel-headed Clover.

The root is tapering; stem ascending or erect, round, striated, nearly smooth, branched and leafy; the leaves are alternate below on long slender foot-stalks and the leaflets oblong, obtuse or notched; the upper pair opposite, narrow, linear, acutely pointed, all single ribbed, with slender lateral veins; dark green in colour, paler beneath and somewhat hairy; the margins towards the apex somewhat toothed; the stipules are long, narrow, linear, pale, membranous, with dark veins. The inflorescence is terminal and sometimes axillary, globe-like heads of crowded flowers mostly without stalk or nearly so; the calyx is sub-campanulate, or bell-like, smooth or slightly hairy, distinctly ten-ribbed at the base; the teeth rigid, broadly acuminate, the lower one much the longest, three-ribbed, the rest single ribbed; all haired, or ciliated

on the margin and spreading; the legume or seed pod is membranous and contains a single rounded seed with a prominent radicle (or rootlet). Somewhat fond of marshy and saline districts, prevalent on the South coasts of England and Wales, abundant in Ireland.

This is readily distinguishable from all the other of our species by its rigid-looking head and remarkable calyx, enlarging and dilating its teeth after flowering. It is not a common plant in this State; but we have found it very prevalent in various parts of the maritime pastures of Italy, and about Pisa it is commonly cultivated in the low damp meadows, where it seems to flourish extremely well, to produce an abundant crop, which is cut green or made into hay. It is probable that it might be cultivated with advantage from Bunbury southwards..



Prairie clover. (*Petalostemon candidus*).

Trifolium amphianthum.

Trifolium stellatum or Starry-headed Clover.

The root is slender and tapering; the stems, several from six to ten inches long, round, branched, ascending and clothed, as is the rest of the plant, with soft hairiness. The leaves are alternate, on short stalks somewhat heart-shaped, the leaflets obcordate (wider at one end than the other); unequally toothed; the midrib stout and the lateral veins prominent; the stipules are large, broadly ovate, pale, thin, membranous, veiny, and toothed on the margin, sometimes hairy. The inflorescence is a globose head of crowded flowers,

elevated on a stalk : the calyx is very downy, ten-ribbed ; its teeth, when in flower, bristle-shaped ; erect, longer than the flower ; in fruit much enlarged and dilated at the base, becoming veiny and spreading in a star-like manner ; its mouth closed with a tuft of hairs. The corolla is small, pink and concealed by the calyx teeth ; the legume is enclosed in the calyx and contains a single pale ovate seed.

This curious species of clover is very frequent in Italy ; rare in Great Britain ; common in maritime and mountainous districts of Western Europe, but it does not appear to possess any great agricultural value. It is an annual and flowers rather late.

Trifolium arvense or Haresfoot Clover.

The root is slender, tapering and branched ; stem erect, about a foot high, alternately branched and spreading, round and clothed with soft hair ; the leaves are on short foot-stalks : the leaflets linear, oblong, the midrib stout, prominent, the margin toothed and covered with soft hair ; the stipules are ovate lanceolate, membranous, downy and ribbed ; the inflorescence terminal cylindrical heads of numerous crowded flowers, elevated on a slender stalk ; the calyx sub-cylindrical, ten-ribbed, very downy ; its teeth bristle-shaped, erect in flower, spreading in fruit ; the corolla is small, pink, inconspicuous, and the legume enclosed within the calyx is single seeded. An annual.

This species is a pretty ornamental plant, producing an abundance of pink downy heads. It does not appear to be a plant selected as food by any class of animal ; it is made good use of as an ornamental plant for adorning chimney pieces during the winter, for which purpose it is well suited, as it retains its elegant form and appearance after being dried, and when mixed with some of the more elegant forms of grasses forms a permanent and beautiful decoration until the fresh flowers of spring appear.

Trifolium scabrum or Rough, rigid trefoil.

The root tapering ; the stems, several from three to nine inches long ; procumbent ; branched at the base and spreading ; round or somewhat angular, rigid, hairy ; leaves on stalks and downy, leaflets oblong, wedge-shaped, with a prominent mid-rib and lateral veins, arched near the margin and unequally toothed ; the stipules are membranous, ovate, acute, ribbed and downy. The inflorescence, ovate heads of crowded flowers, terminal, and in the axis of the upper leaves the base is enveloped in an involucre (whorls of bracts) ; the calyx is cylindrical, in fruit downy, ten-ribbed and furrowed ; the teeth unequal, rigid, lanceolate, acute, erect in flower, spreading and recurved when in fruit ; the corolla is small, pale pink, but inconspicuous ; the legume is membranous and single seeded.

This clover flourishes well on the chalky hills of Kent, which seldom have more than two to three inches of soil on the chalk. It is also well known in Scotland and Ireland, but agriculturists would only be inclined to label it with a third class certificate.

Trifolium striatum or Soft-knotted Clover.

The root is slender and tapering ; the stems numerous, procumbent, of various lengths ; round, branched and downy ; the leaves are numerous, the lower on long foot-stalks, the upper on short ones, downy ; the leaflets are

obovate, finely toothed and downy, the mid-rib prominent, and the lateral ones straight, parallel, the leaflets of the lower leaves often heart-shaped; the stipules are broadly ovate, pointed, membranous, striated, with coloured veins, and downy. The inflorescence, small ovate heads, becoming cylindrical, terminal and lateral, all with an involucre at the base; the calyx is hairy, its tube cylindrical, ten-ribbed and deeply furrowed, becoming after flowering, swollen and humid; the teeth unequal, awl-shaped, rigid, always erect and ciliated with a margin of rigid hairs; the corolla is scarcely larger than the calyx and is of a pale rose colour; the legume is membranous, containing two seeds but only perfecting one. It is an annual, and is frequently found in dry situations in Europe and America.



Egyptian clover.
(*Trifolium alexandrinum*).



Japan clover.
(*Lespedeza striata*).

Trifolium suffocatum or Suffocated Clover.

The root is slender, long, and tapering; the stems are prostrate, mostly several, round, smooth, mostly buried under the ground; the leaves are on long slender foot-stalks; the leaflets obcordate, smooth, and acutely toothed towards the apex; the stipules are large, ovate, acute, membranous and striated; the inflorescence stalkless, globose, axillary heads of numerous smooth, crowded, erect flowers, having an involucre enveloping the base; the calyx is membranous, sub-cylindrical, slightly striated and sometimes scattered over with a few slender hairs; the teeth unequal, lanceolate, acute, spreading, and with its mouth open; the corolla is small and inconspicuous, tawny-pink; the legume is oblong and two-seeded.

This species is an annual and particularly partial to wet sandy soils, but does not appear to have much value as a fodder plant.

Trifolium glomeratum or Smooth, Round-headed Clover.

The root is tapering and branched; the stem prostrate, smooth, round, or somewhat angular, more or less branched and leafy, from four to twelve inches long. The leaves have long, slender foot-stalks; the leaflets of the lower leaves obcordate, of the upper oblong, all smooth, with the mid-rib and the lateral veins prominent; acutely toothed. The stipules are pale, thin, and membranous, striated with veins, lanceolate, taper-pointed. The inflorescence consists of axillary, globe-like heads of numerous smooth sessile flowers. The calyx is cylindrical, ten-ribbed and furrowed; the teeth ovate, acute, becoming leafy, veiny, and reflexed; the corolla is small, pink; the vexillum (the upper more expanded petal) is striated; the legume is membranous, mostly two-seeded.

This clover is also fond of sandy pastures and is to be found in abundance in France and Italy.

Trifolium repens, White Trefoil or Dutch Clover.

The stem is long and creeping, putting out fibrous roots from the joints, smooth, striated, solid and branched; the leaves are alternate, the foot-stalks long, slender, channelled, erect; leaflets three, equal, on short stalks, roundish, ovate, or obcordate, the margin finely toothed, the mid-rib prominent, and the lateral ones fine, parallel, straight, smooth, sometimes reddish on the under side, the upper mostly with a pale transverse mark near the base, sometimes it is a dark purple or green; the stipules are pale, thin, membranous, ovate, obtuse with a linear point; the inflorescence consists of axillary heads of numerous crowded flowers, sub-umbellate in character; the common stalk long, smooth, and striated, the partial stalks slender, downy, about as long as the calyx, erect in flower, curved downward in seed; the calyx is smooth, tubular, its teeth linear, lanceolate and the two upper ones longest; the corolla is white, persistent, becoming pale brown; the legume is three or four seeded. A perennial, common everywhere, and popular with all agriculturists.

Curious varieties of this species are occasionally found in wet places; some have the partial foot-stalks much elongated and the teeth of the calyx expanded into a leafy-toothed segment; and it is not an unfrequent occurrence to find with these the legume enlarged and protruded beyond the calyx on a slender pedicle; and not unfrequently the legume is expanded; all are abortive in these varieties. The pedicles are all erect and not recurved after flowering.

This is one of the most valuable species of fodder grasses, both for fodder and pasture lands, *especially in a light sandy soil*. It is enabled by its long, solid, creeping stems to bear long droughts of summer. From its putting out roots at every joint, it is enabled to bear continued cropping without injury, and its being trod down by cattle is a means of increase rather than of destruction, for then each joint forms an independent plant and puts out its numerous stems and branches. It is a remarkable circumstance in the history of this plant that it seems to have the power of preserving its seeds for an

indefinite time. As a valuable pasture plant this seems early to have been noticed. Virgil says:—

*If milk be thy design, with plenteous hand
Bring clover grass; and from the marshy land,
Salt herbage for the foddering rack provide,
To fill their bags and swell the milky tide.*

In former days the shamrock or shamrog, the national badge of the Irish, appears to have been the leaves of the *Oxalis acetosella*, but in more modern times the leaves of the clover have been its rival for the national honour. It was supposed formerly that clover had a supernatural power, and a remnant of the former superstition is still found among the peasantry and others by their seeking with diligence a four-leaved clover, and when found, it is considered a most favourable omen.

Trifolium procumbens or Hop Trefoil.

The root is slender and fibrous; the stem round, smooth or only slightly hairy, much branched, erect and spreading or procumbent, from six to twelve inches long; the leaves are stalked; leaflets ovate or obcordate, smooth, veiny on the under side; toothed, the lateral leaflets without stalk, the middle one elevated on a slender foot-stalk; the stipulates are half ovate, acute, entire, ribbed and mostly hairy; the inflorescence consists of dense crowded heads, becoming oblong; of about forty yellow flowers, arising from the axis of the leaves and elevated on a peduncle or stalk, which is as long and often much longer than the leaves: the flowers vary from a pale sulphur colour to an orange yellow; the calyx is smooth, the two upper teeth smallest, the mouth naked; the corolla is persistent, deflexed after flowering, and the vexillum becomes deeply striated, tawny and membranous; the legume is small, pointed, and single-seeded.

This clover also favours dry situations, but is only considered second rate by agriculturists.

Trifolium filiforme or Lesser Yellow Trefoil.

The root is tapering and fibrous; the stems mostly numerous, round, smooth or downy at the extremity; slender, prostrate, from four to twelve inches long, leafy and more or less branched; the leaves are stalked; leaflets obovate, or obcordate, finely toothed, a somewhat glaucous green, paler beneath, finely ribbed; the lateral ones on short stalks, the terminal one elevated on a slender foot-stalk; the stipules are acute, ovate, and mostly fringed; the inflorescence consists of small axillary heads of from three to ten flowers, elevated on a slender foot-stalk, downy and longer than the leaves; the calyx is smooth, its mouth naked, the teeth unequal, the two upper ones shortest, mostly fringed with fine hairs; the corolla is small, pale or orange yellow, becoming dark brown and membranous; the legumes are obovate, single, rarely two-seeded.

This clover also favours dry situations. Like the last species mentioned it is a favourite food of sheep and cattle, and as it flourishes best on dry sandy or gravelly soil, it is found one of the best and most useful of artificial grasses, especially for those crops intended for making hay or for mowing green for stall-feeding. The numerous heads of beautiful bright yellow

flowers which they produce render it a very pretty, gay-looking plant, but more especially the larger flowered and deeper-coloured species which grow in great profusion on the Continent of Europe; the writer has seen it growing in profusion at several places within 25 miles of Perth.



Mexican clover (*Richardsonia scabra*).

Trifolium fragiferum or Strawberry-headed Clover.

The roots are fibrous; the stems prostrate, long, spreading, branched, leafy, round, smooth, and takes root from the joints; the leaves have long foot-stalks; leaflets no foot-stalks or very short ones, ovate or obovate, or obcordate, finely toothed, a dark green, paler beneath with a prominent mid-rib and numerous fine lateral veins; the stipules are pale, membranous, linear lanceolate, with a slender elongated point; the inflorescence is a globe-like head of numerous crowded pinkish flowers, elevated on a long smooth or slightly downy stalk arising from the axis of the leaves, enveloped at the base in an involucre cut into numerous narrow lanceolate segments; the calyx is downy, tubular, two-lipped, the upper side becoming after flowering much dilated, membranous, thin, and bladdery, reticulated with numerous coloured veins, from this part of the calyx enlarging, and the underside remaining the same; the two upper teeth are curved downwards, forming a complete covering and protection for the enclosed legume; the corolla is small, rose-coloured or pink, soon fading and withering away; the legume is small, roundish and two-seeded. It is a perennial, but appears to have little agricultural value; it is, however, a remarkable plant from the changes which the calyx undergoes after flowering.

Trifolium resupinatum or Reversed Trefoil.

The roots are branched and fibrous ; stems several, prostrate or ascending, round, smooth, branched and spreading; the leaves are numerous, dark green, paler beneath, often marked with a dark stain near the base; stalks of the lower leaves are long, those of the upper leaves short; the leaflets are obovate, or oblong, acute, toothed and rarely notched; the stipules are narrow, short, and linear lanceolate; the inflorescence is roundish, becoming globe-like; heads of crowded flowers, elevated on a short stalk, which becomes much elongated ; the calyx is small, the upper one hairy, becoming after flowering much enlarged, dilated, pale, thin, ovate, with a long narrow tubular neck, netted with straight longitudinal ribs and numerous slender transverse ones, terminated by two bristle-shaped spreading teeth; the corolla is elongated, pale pink, the vexillum placed opposite the lower three-toothed lip and becoming *recurved*; the legume is small and mostly two-seeded; an annual.

This species of strawberry-headed clover has been introduced from Europe, where it is not uncommon. In Italy it is frequently cultivated and grown for hay crops, or it is cut green and consumed in that state. It appears to flourish extremely well on light sandy soil, and produces a very heavy crop. In many places where the soil is light and moist it promises to be a very valuable plant from its great produce, and may with advantage in many instances, be substituted for *T. procumbens* or *T. filiforme*.

Trefoil subterraneum or Subterraneous Trefoil.

The roots are fibrous; the stems several, round, branched, spreading close to the ground and more or less hairy, like the rest of the plant; the leaves are on long, slender stalks; the leaflets all nearly without stalks, inversely heart-shaped, the mid-rib prominent, and numerous lateral fine veins, the margin obscurely toothed; the stipules are large, ovate, membranous, veiny and hairy; the inflorescence consists of from two to five axillary heads on a slender stalk, erect when in flower, elongated and deflexed when in fruit ; the flowers are small and white; the calyx of the perfect fruit is nearly tubular, pale green or white, five-ribbed, terminating in five long, slender bristle-like teeth, and hairy, becoming somewhat inflated in fruit; as the stalks become deflexed after flowering the calyx becomes deflexed, and from the extremity of the stalk several other abortive calyces are put out, having their five teeth spread in a star-like manner; these at length are also deflexed and surround the fruit-bearing calyces, forming a globe-like head; the legume contains a single black ovate seed. An annual, and partial to dry, sandy and gravelly situations.

It is interesting to observe the growth of this plant, spreading its long, slender branches on the surface of the ground and from the axis of the leaves putting out its cluster of about three flowers on a stalk, which is at first short and erect, afterwards it elongates and is recurved, and from the base of each of the calyces, which become reversed, are protruded small filaments, like roots; these penetrate the ground and the calyx teeth are much elongated, but we have not been able to ascertain if the calyx expands into a new plant or not.

Cultivation.

And now a word as to its general cultivation. Scratching the soil will not answer, deep cultivation is essential; let the subsoil plough follow the plough with the mouldboard, cross plough and harrow thoroughly. Stirring

the soil deeply gives a chance for the rain to sink deeper into the soil out of the reach of the sun's power, but not out of the reach of the fine plant hairs of the roots of the clovers. The absolutely best manure combination that the writer has any personal knowledge of was 12 tons of fresh dung with 3cwt. of superphosphate, which gave a clover hay crop of 45 cwt.; but dung not being available in large quantities in this State, the next most powerful manure is basic slag applied at the rate of 4cwt. per acre, yielding 44cwt. per acre and vastly improving the after crops. Failing basic slag, use 4cwt. of superphosphate, which has given 40cwt. of clover hay per acre.

Clover as a manure, ploughed in just before flowering, greatly improves the soil and all subsequent crops. A crop of clover ploughed in on one of the Canadian experimental farms, followed by oats for five years without any additional manure, gave the following crops:—29, 47 1/5th, 48 1/3rd, 46, and 37 1/5th bushels per acre, respectively.

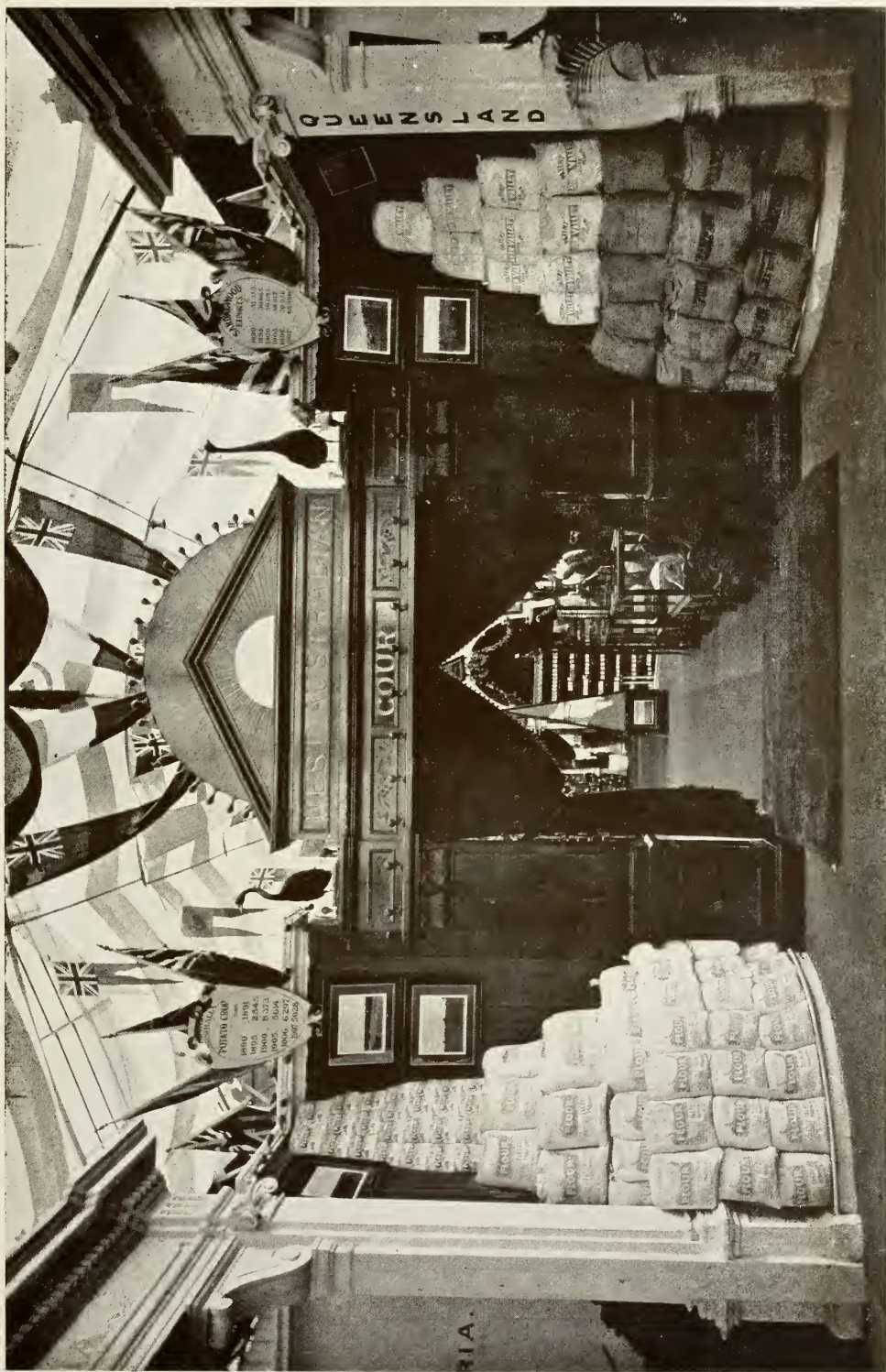
SMUT IN WHEAT.

HOT WATER TREATMENT.

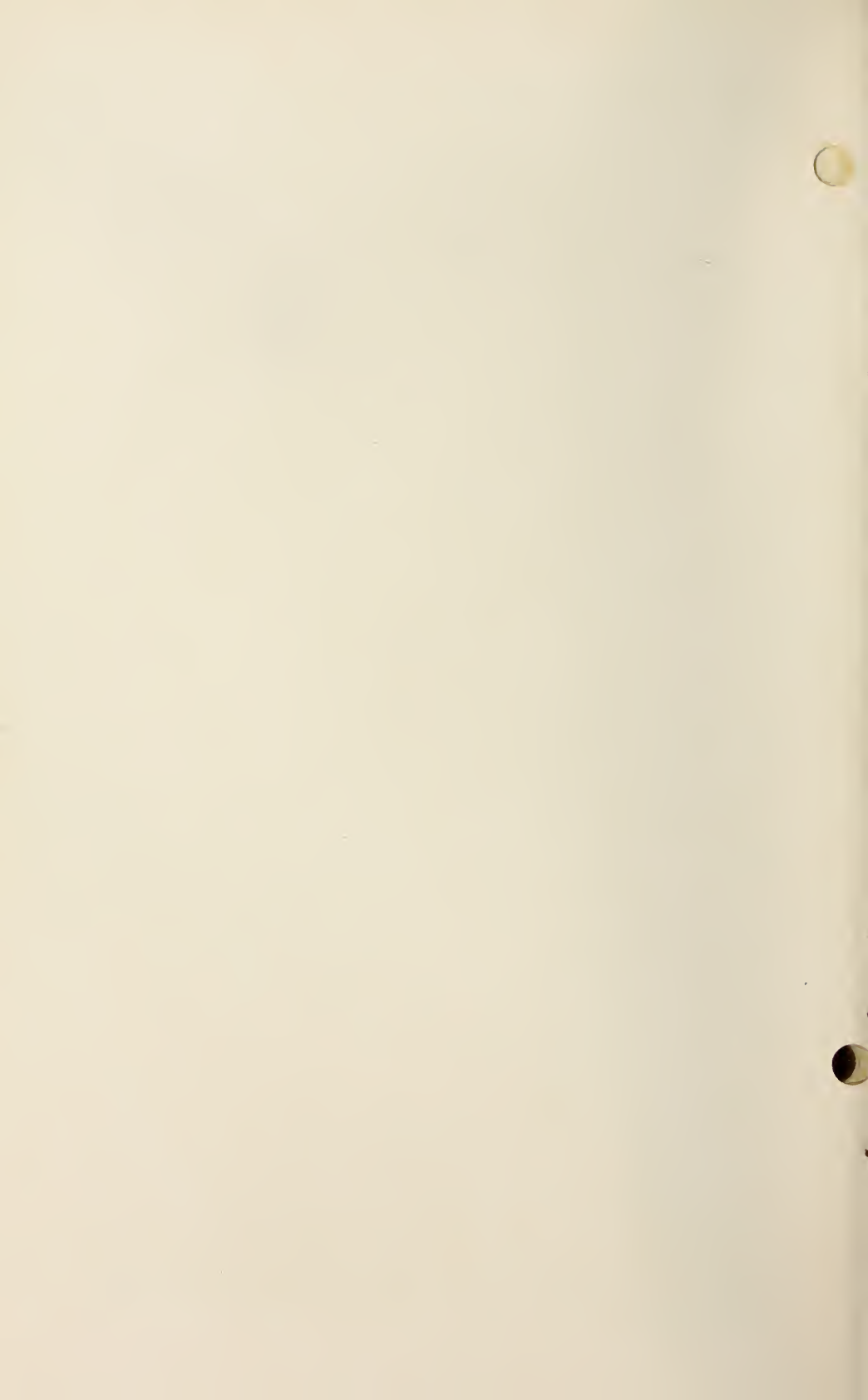
The following simple remedy is one of several methods advocated by Professor T. W. Kirk, New Zealand Government Biologist, for prevention of smut in wheat:—

The Hot-water Treatment.—Numerous experiments by Jensen, Arthur, Kellerman, and a host of others have shown that hot water is an almost sure preventive of oat-smut. Provide two large vessels, holding at least 20 gallons each. One of these should contain warm water at say 100deg. to 115deg. Fahr., and the other hot water at 132deg. to 133deg. Fahr. The first is for the purpose of warming the seed before dipping it into the second. Unless this precaution is taken it is difficult to keep the water in the second vessel at a proper temperature. Place the seed to be treated at the rate of half a bushel at a time in a closed vessel which will allow the free entrance of water on all sides. A perforated tin vessel is the most suitable for this purpose. The seed is then plunged into the vessel containing warm water for about one minute, and is then transferred to the one containing hot water, where it is to remain ten minutes. The following precautions must be taken: (1.) Maintain the temperature of the water in the second vessel at 132deg. Fahr. to 133deg. Fahr., and in no case allow it to rise higher than 135deg. Fahr. or fall lower than 130deg. Fahr. (2.) See that the volume of water is much greater (at least six or eight times) than that of the seed treated at any one time. (3.) Leave the seed in the second vessel for ten minutes.

The potassium-sulphide treatment, as well as the hot-water method, not only prevents smut, but also greatly increases the yield; and the treated seed germinates quicker and is much stronger than the untreated seed.



WESTERN AUSTRALIAN COURT, FRANCO-BRITISH EXHIBITION.—Jarrali Entrance Arch.



AGRICULTURAL BANK.

NEW GOVERNMENT PROPOSALS.

The Minister for Lands and Agriculture (Hon. James Mitchell) has instituted a new arrangement under which a successful applicant for land will know exactly what assistance he may expect from the Agricultural Bank when he takes over and enters upon the development of his holding. Nothing more is to be done by the Bank in the way of assistance to be given, but where possible the information as to what advances will be made to the successful applicant on the particular area open for selection will be available prior to the date of the closing of applications, so that the would-be settler will know his exact financial position in the event of his securing the land.

The new arrangement will first come into force in regard to 11 Avon locations, numbering from 11,390 to 11,400, situated five or six miles north of Baandee Siding, on the Eastern Goldfields Railway. These localities are now being advertised in the *Government Gazette* as open for selection on and after July 14 at Northam at prices varying from 4s. per acre to 17s. per acre. The areas of the blocks are from 113 acres to 920 acres. It has been arranged with the Agricultural Bank that intending selectors may obtain information at either the head office or the Government Land Agency, Northam, as to the amounts that the Bank will advance for the purpose of improving any of these lots, and the nature and value of the different improvements necessary to obtain such advances. For instance, applicants may find on inquiry that the successful applicant for Location 11,396 of 822 acres, which is priced at 14s. per acre, will be able to secure advances up to £500 if the Agricultural Bank is satisfied as to his *bona fides*. The improvements required for this amount will be:—Ringbarking, 500 acres at 1s. 3d. per acre, £31 5s.; clearing, 150 acres (full) at 20s. per acre, £150, and 400 acres (half) at 20s. per acre, £200; fencing (six wires), 229 chains at 6s. per chain, £68 14s.; water (wells or dams), 801 cubic yards at 1s. 3d. per cubic yard, £50 1s.; total, £500. The advances will, of course, be subject to the usual conditions governing a loan from the Agricultural Bank, particulars of which may be obtained on application to the managing trustee.

Similar particulars are available in regard to all the locations mentioned, with the exception of Nos. 11,397 and 11,398, on which the Bank will not be prepared to advance separately.

The intention of the Minister is in future, when new surveyed blocks are being thrown open for selection, to have similar particulars prepared in regard to them. It is also his intention to fix the date on which the Land Board will sit to deal with each batch of locations that may be thrown open, prior to the date of closing of applications for succeeding batches, in order to enable unsuccessful applicants to apply for other land without having to wait any great length of time.

BENEFICIAL INSECTS INTRODUCED BY MR. G. COMPERE, ENTOMOLOGIST.

The following report has been submitted to the Under Secretary by the Assistant Entomologist on the introduction of a consignment of beneficial insects by Mr. G. Compere, Government Entomologist, from Oriental countries:—

I beg to submit report on the parasites introduced by Mr. Compere on 8th March last. Mr. Compere returned from the Orient on the 8th April. He brought with him several large packages containing live plants infested with parasitised Lecanium and Red Scale. We at once set to work and built a temporary breeding compartment, divided into two, and into this the material was placed. It was then found that the mice were eating the scale and thereby destroying the parasites. This necessitated the making of four large breeding cases, which were duly ordered and delivered at a cost of 35s. each. The material was placed in these and secured against the mice. On the 14th the first parasites began to issue.

There are three species of Lecanium parasites and six of Red Scale. Fresh local Black, Brown, and Red Scale had been prepared in anticipation and placed in breeding-cases, and into this material the parasites as they hatch out are placed.

So far all the plants brought by Mr. Compere are alive and yielding many parasites. A few of the new species of Red Scale parasites have been placed in the public gardens, but the remainder will be used for propagating a large stock in readiness for distribution early next summer.

To this end the gallery at the north of the office, which was unoccupied, has been utilised and artificial heat applied. The breeding-cases and frames have been placed therein and the parasites are doing well, giving promise of great work in the future.

Mr. Compere also brought another species of Cabbage Aphis parasite and one on Cut Worms. These have hatched out and been liberated.

Another species of *Rhizobius* ladybird from Ceylon, having a white hairy larvæ, was also introduced, twenty adults and ten larvæ being liberated in the Government Gardens.

Mr. Compere was absent from this State 13 months, returning here on the 8th April, 1909, and leaving for the Orient again on the 25th May last. He intends to secure parasites, if possible, for all prevailing pests.

L. J. NEWMAN,
Assistant Entomologist.

28th May, 1909.

CO-OPERATIVE BACON-CURING.

LOUDON M. DOUGLAS.

Lecturer on the Meat Industry, Edinburgh and East of Scotland College of Agriculture.

Many inquiries are made from time to time in respect to the best method of bacon-curing and the formation of societies in rural districts for developing the industry in this State on an established commercial basis. It will, therefore, interest many of our enterprising readers to reproduce the following lecture on the subject by Professor Loudon M. Douglas, of Edinburgh, which was published in the May number of the *Journal of the Board of Agriculture*:—

Bacon curing as an organised industry, said the lecturer, has only come into existence within the last half century. As far back, however, as 1705, we find that Edward Lisle, in his *Observations in Husbandry*, refers to the Wiltshire cure of bacon, though it was not until much later that a great expansion in the trade in the County of Wiltshire caused the name associated with this produce to become celebrated throughout the world. The bulk of the bacon which is used in the United Kingdom is still cured in what is known as the Wiltshire fashion, or in whole sides, and there are at the present day several very large factories in England in which it is the principal product. In at least one of these factories the number of pigs handled every week exceeds 2,000. Such a number is small, however, in comparison with the numbers handled in some of the packing houses of the United States, where it is no uncommon thing to slaughter between 5,000 and 6,000 pigs in one day. The treatment and quality of the meat, however, are much below the standard aimed at in the United Kingdom, and notwithstanding the immense supplies of bacon which reach our country from abroad, the high price of the home product is on this account maintained.

The early days of bacon curing in the middle of last century gave little promise that it would become a great industry in the United Kingdom. The methods which were in use then were of the most primitive character, and consisted, for the most part, of simply burying the flitches or sides of bacon in dry salt or immersing them in a saturated solution of salt, the meat being allowed to remain there until the tissues became impregnated with salt. The process was, of course, a destructive one, and the product was not attractive to the palate. The farmers in those days were bacon curers in a rough-and-ready way, and the tradition lingers in Cumberland, Westmorland, and Yorkshire that the best bacon is still obtainable on the farms amongst the hills. It is unquestionably a fact that, occasionally in Yorkshire, it is possible to find hams which are of quite a special flavour, and which cannot be imitated in modern curing cellars. But the practice of curing on the farm is gradually passing away and is being replaced by modern bacon factories, in which the business is organised and reduced to an exact science.

An early reference to bacon curing in Scotland will be found in Robert Henderson's "Treatise on the Breeding of Swine and the Curing of Bacon,

with Hints on Agricultural Subjects," 1814, and it would appear from this account that the process of curing bacon was at that time carried on under great difficulties.

In Ireland it is said that a bacon factory was carried on at the town of New Ross in Co. Wexford for 200 years, and that large quantities of pickled pork were prepared there for the British Navy. Of curing bacon, however, as it is understood at the present day, there does not appear to have been any development in Ireland before the middle of last century. Factories then began to be formed, particularly in the province of Munster, and at the present day there are nine factories in that province, with a capacity of about 15,000 pigs per week.

In the whole of the United Kingdom, however, the number of bacon factories is probably not more than fifty, though there are naturally many hundreds of smaller curers, not only on the farms, but amongst pork purveyors.

Co-operation and Bacon Curing in Denmark.—The greatest impetus to the development of bacon curing was given in 1887, when Danish pigs were prohibited from entering Germany. At that time there were a few bacon factories in Denmark, but none were carried on as co-operative organisations. When it became evident to the Danish farmers that their live swine which they had been, up to that time, sending to the German markets, would have to be utilised at home, they at once turned their attention to converting them into bacon, and started the first co-operative bacon factory at the town of Horsens. Since then co-operative bacon curing in Denmark has increased very largely, and in 1905 there were 30 co-operative bacon factories. There has also been a considerable development in the private factories, of which there were 24 in 1905, making the total number of factories in Denmark 54. This development was only possible because the Danish factories managed to suit the taste of the English bacon buyers, practically the whole of the bacon thus produced in Denmark being sent to the British markets. In 1908, the imports of bacon from Denmark amounted to 2,051,148 cwt., with a value of £5,685,526.

Bacon Curing Associations.—Co-operation was thus instrumental in causing a rapid development of the bacon industry in Denmark, but there has been no similar extension in this country, and it is only recently that British farmers have begun to consider the possibility of applying co-operation to the bacon industry in the United Kingdom. The first Farmers' Co-operative Bacon Factory was inaugurated at Roscrea, in Co. Tipperary, Ireland, in January, 1908, and it was able, under adverse circumstances, to show a successful record in its first year. The Roscrea Factory has a nominal capital of £15,000 of which rather less than £12,000 was subscribed, about £7,000 being absorbed for the site, buildings, and machinery. The initial expenditure on these items left a little over £4,000 for working capital. Experience showed that this was too little, and that the working capital of such a factory, having a capacity of about 750 pigs per week, should be at least £10,000. With a sufficient capital success may be assured, as by modern methods it is possible to realise high prices for home-cured bacon, and at the same time to utilise all the by-products which arise in such a factory.

Forming a Co-operative Society.—No better example of the methods necessary for the formation of a co-operative society could be given than the Roscrea bacon factory. The shareholders in this factory consist of some 2,800 members, the majority of whom are small farmers. At the commencement,

when the subject of a co-operative bacon factory was discussed, a provisional committee was formed, and under its guidance the whole of the district was canvassed for support, and this support was freely given, so that the number of shareholders reached the large figure mentioned. The society was then registered under the Friendly Societies Acts, and shares were issued at £1 each. Subsequently the provisional committee elected a directorate, and they carry on the factory in much the same way as in the case of a joint stock company.

The principal difficulty in such a factory arises from the inability to guarantee a constant supply of pigs, and this was met by the subscribers being asked to sign a guarantee under a penalty, that they would supply all their pigs, of the weights required in the bacon trade, to the Roserea Bacon Factory. This was intended to defeat any unfair attempt to induce farmers to sell their pigs at intentionally enhanced prices to other bacon factories. As a matter of fact, such attempts were really made, but it is to the credit of the Roserea shareholders that they refused to accept any such offers.

In fixing upon a site for a bacon factory, it is well to bear in mind that it is usually in dairying districts that large numbers of pigs are available. The modern method of pig feeding has shown that a combination of separated milk and cereals is by far the best fattening material, and the future of the bacon curing industry is, therefore, to a large extent in the hands of dairy farmers.

The Breed of Pigs.—The first care is the breed of pigs. There are in the United Kingdom six well-known breeds which lend themselves to bacon curing. These are:—(1) Large White Yorkshire, (2) Middle White Yorkshire, (3) Berkshire, (4) Tamworth, (5) Large Black Suffolk, (6) Large Black Sussex; and, of these, the most useful for bacon curing purposes are the Yorkshire and Berkshire breeds. For crossing purposes, however, the others are of considerable value, and it must be remembered that a pure breed of pigs is not wanted by the bacon curer. What he wants is the bacon pig, and this is an animal which does not belong to any particular breed.

A bacon pig should mature in about seven months, and it should turn the scale, "dead weight," at about 12 stone, or 168lb. This size represents a live weight of from 15½ to 16 stone, and may generally be regarded as fetching the highest price for bacon curing purposes. Smaller pigs which are used for various sections of the trade, such as the making of hams and middles, may be in demand in certain localities, as heavier pigs may also be in demand; but on the average these will be wanted in small numbers.

The Construction of a Factory.—When a co-operative society has been formed, the first business will be to arrange for the construction of the bacon factory, and it will be found that, in comparison with the older factories, it is possible to construct a modern building very much more cheaply than was at one time the case. It was considered essential in the early days of bacon curing that there should be strong, thick walls around the factory. This notion, however, has been abandoned, and factories built for the most part of corrugated iron are likely to be more common than any other type in the future. In such a factory the construction can be so arranged as to lend itself easily to extension, if necessary, at any time. The main structure need not be expensive; corrugated iron is quite good enough for the roof and sides. In so far as the cellar, chill room, and engine room are concerned, these can advance

tageously be constructed of concrete walls, with hollow spaces, or built with concrete bricks or slabs with hollow centres.

The general arrangement throughout is that, as far as possible, one department follows the other in sequence, the object to be kept in view being to minimise the labour in connection with the cycle of operations.

It has been found that the best form of factory is such as would be contained within a rectangular space, and in two of the most modern factories, i.e., at Roscrea in Tipperary, and Dunmow in Essex, this design has been followed with the best possible results. Perhaps the best method of understanding the construction referred to will be to follow the operations through a modern factory.

Operations in a Modern Bacon Factory.—The pigs are landed on a receiving platform, where they are first of all weighed by the live weight and supplies can be paid on that weight at once, if they so desire. If, however, they prefer to receive payment on the "dead" weight, this is ascertained usually the day following that upon which the live pigs have been received. The dead weight averages about 25 per cent. less than the live weight.

After being weighed the pigs are driven into the sties, where they are allowed to remain overnight, and the slaughtering is usually carried out in the morning. They are driven, one by one, into the catching pen, where they are shackled, or caught up by means of leg chains, a running noose being formed by means of the chain slipped through a ring, and the noose thus made is passed over one of the hind feet. This chain is then attached to a hook at the end of a steel rope, which is governed by a hand or power hoist. By this means the animals are hoisted to an overhead bar, and, when they are in position, are slaughtered, the blood being let out very quickly by the insertion of a knife in the direction of the heart. From the time of the live animals entering, to the moment the carcasses are suspended lifeless, is not more than one minute, so that in the modern factory this operation is very expeditious.

The carcasses are pushed along the overhead bar to the bleeding passage, and are allowed to hang there some little time, after which they are pushed off the bar on to a dumping table. This dumping table forms part of what is known as a "Slaughtering Tack," which is the main part of a pig abattoir. While on the dumping table the leg chains are removed, and the carcasses are then rolled into a rectangular scalding vat, capable of holding some five pigs at once. This vat is partially filled with water at a temperature of about 180deg. F., and the carcasses are turned round and round in this bath until the hair becomes loose. They are then, one by one, tilted on to a scuttling table, where they are scraped almost free from hair.

A hook is then inserted in the apex of the lower jaw, and the animals are suspended to a track bar, head upwards. They are pushed along this bar until they come under the opening of a vertical singeing furnace, which is so constructed that the carcass of the pig may be hoisted through a circular fire, and in this way the whole carcass is burned or singed. This operation takes only a quarter of a minute, and the burnt carcass is again lowered to the track bar, when it presents a very black and shrivelled appearance. This burning, however, is a great advantage for Wiltshire bacon, inasmuch as it imparts a particularly piquant flavour to the meat. The fact, also, that the fat underneath the skin is momentarily melted is also an advantage, as in subsequent operations it becomes firmer than it would otherwise be.

After leaving the singeing furnace the carcasses are thrown into a cold-water bath, and are cooled, after which the sinews of the hind feet are exposed and a gambrel inserted, so as to spread the hind feet apart.

By means of the gambrel the carcasses are then hoisted on to a track bar, and are scraped quite clean and washed. The intestinal and general offal is then removed and taken to a separate apartment, where the different portions are assorted for various uses.

The flake lard is always left with the carcass, and is weighed in together with the head and feet, so as to form the "dead weight," which is sometimes taken while the carcass is warm, and at other times is ascertained after the excess of animal heat has dissipated. When the carcass is weighed in the warm condition an allowance of four pounds is made for loss of weight in cooling. Cooling in the open air, so as to allow of the dissipation of the excess of animal heat, usually occupies about six hours. After removing the offal and weighing the carcasses, they are split up into sides. The head and forefeet are severed and the lard removed. It may be mentioned here that the head and feet are forthwith chilled and put into pickle to be cured.

The Curing Process.—The sides are pushed on into the hanging house, in case they have not already been allowed to hang, after which they are pushed along the track bar into the chill room, where they are kept at a temperature of 38deg. F., until, on inserting a meat thermometer into the gammon end, it registers 40deg. F. On the average, it takes 36 hours to reach this degree of coolness, and when it has been attained the sides are taken into the curing cellar, where finally they are trimmed, and at once pumped with a recognised pickle in some fourteen different places, after which they are laid down on the cellar floor, and stacked in tiers 10 sides deep. The cellar is kept at a temperature of about 42deg. F.

Each side is covered over, first of all, with an equal mixture of curing antiseptic and saltpetre, in a finely granulated state, and on the top of this is placed a thick layer of salt. For mild-cured bacon this is all the curing that is required, and in about 14 days' time the process of curing is complete, after which the bacon is taken out and washed in cold water, and should then be in a state for selling as "green" bacon. If wanted as "dried" bacon, it must be hung in a drying room for three days in a temperature of 90deg. F., and is then available as "pale dried" bacon. If, however, it is wanted as "smoked" bacon, it must be hung for three days in a smoke stove where the temperature does not exceed 90deg. F., and where a thick volume of smoke is produced from hard wood sawdust, such as oak, ash, or beech.

These operations refer to what is technically known as "Wiltshire bacon," which is a commodity that is produced in all bacon curing countries. There are, however, many variations of the bacon curing trade, and also subsidiary operations, which in themselves are businesses, such as sausage making and lard refining. The products of a bacon factory may also include hams, middles, rolls of bacon, or other special products, but the processes of manufacture are only variations of the general principle of curing Wiltshire bacon. What is absolutely indispensable in the bacon factory is competent management and the employment of a staff who are acquainted with the various processes to be carried out.

Technical Education.—Bacon curing on a large scale is a highly technical business, but unfortunately no facilities exist for acquiring a knowledge of the technique of the business at any of our educational centres. This seems

the more remarkable when it is considered how important pig breeding and bacon curing are as an adjunct of dairy farming, and there can be little doubt that the absence of technical instruction results in an immense waste in by-products and in imperfectly manufactured articles, which would be avoided by men skilled in the science of the business. In other countries, notably in the United States of America, the packing houses have found that, by devoting attention to the by-products, they have opened up new and highly remunerative sources of revenue which were hardly thought of 25 years ago. The analytical chemist and the bacteriologist are considered essential in the economy of an American packing house of any pretensions. Hence these packing houses can, by bringing the best scientific knowledge to their assistance, place their main products in distant markets in other countries at a price below that of the home-produced articles.

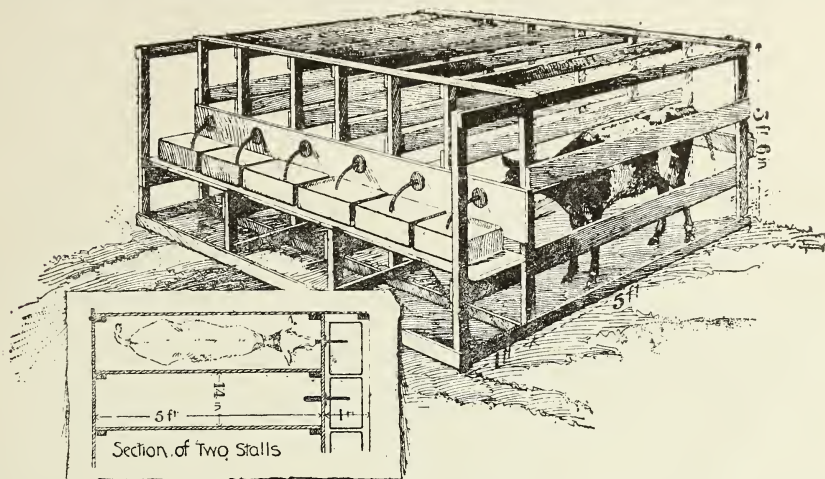
It is not suggested that there should be a scientific staff in the comparatively small bacon factories of the United Kingdom, but it is none the less desirable that facilities for the technical instruction of managers should be provided at our colleges, so that men who propose to make a business of bacon curing may have opportunities of acquiring a knowledge of the technique of the subject. A bacon factory manager should be conversant with the breeding of pigs and the principles which govern their development for bacon purposes. He should also have some knowledge of their anatomical structure and of veterinary science relating to them. To this may be added a knowledge of the chemistry and bacteriology of meats, as well as of the curing processes, and of the uses to which the by-products in a bacon factory may be put. At the present day the by-products are practically wasted, and it is no exaggeration to say that if this department of the subject were better understood, it would add considerably to the profits of the bacon curing industry.

TREATMENT OF CALVES.

FEEDING OF PODDIES.

The present practice of collecting milk for calves in wooden casks and feeding from wooden troughs cannot be too strongly condemned. So long as these conditions prevail some derangement of the digestive organs of calves must be expected. Metal receptacles should be used, so that they can be thoroughly cleansed daily by scalding. To prevent the calves drinking too rapidly a number of stalls should be erected, and each calf allowed to drink undisturbed from a separate bucket, as is carried out at the Government Stud Farm, Berry. The system of feeding the calves by means of rubber teats approaches nature's method as near as practicable and aids in the assimilation of food. Considerable care is, however, necessary in order to keep the tubes and teats perfectly clean, and in any case where there may be doubt that they will be so kept, miniature bails with a metal bucket for each calf are preferable. The lower half of a kerosene tin makes an excellent calf-feeding

bucket. An allowance of the mother's milk materially assists the calf's development and strengthens its constitution. On no account must whey be con-



sidered a sufficient food for calves. The addition of formalin to the milk is also recommended as a further preventative. One ounce of formalin should be mixed with a pint and a half of water and half a teaspoonful of the mixture added to the milk of each calf. A dose of castor oil (2ozs.) should be given any calf showing signs of digestive derangement or scouring, followed by the administration of formalin, as above; but good results from treatment must not be looked for and all efforts should be concentrated on prevention.

Clean Calf-pens.

The calf-pens should be swept out daily. The sides of the pens and shelter-shed should be painted with lime-wash, and the floors sprinkled with disinfectant periodically. Calves showing symptoms of the disease should be immediately removed and isolated for treatment or at once slaughtered. Should the disease reappear the pen must be again thoroughly disinfected. Any of the carbolic fluid sheep-dips diluted with water make a suitable disinfectant for the purpose.

The Calf-paddocks.

On no account should an affected calf be allowed to be run in the calf-paddock. Any calf showing symptoms of the disease should be immediately removed and its dejections either burnt, deeply buried, or disinfected. On farms where

the disease exists the necessity of enclosing new paddocks for the calves is strongly advocated.—(N.S.W. *Agricultural Gazette*).



POULTRY NOTES.

TURKEY REARING.

(By C. F. Faulkner in the *Farmers' Advocate*.)

The most widely known varieties of turkeys are the American (or Mammoth Bronze), the Cambridge Bronze, the Norfolk Black, and the Austrian (or White) Turkey: of all the most popular is undoubtedly the Mammoth Bronze, on account of its size and hardiness. But whichever variety is selected, the object in view is invariably the same, and that is to obtain a well-developed thick-breasted bird. And now, how is this to be obtained?

First as to age. A turkey in its wild state does not mature till it is two years old, and a gobbler will retain his supremacy in a flock for four or five years. I prefer, all things considered, two-year-old hens and a cock a year or two older, and, for size, to obtain this in the hens if possible; the larger the better, anything from 18lb. to 24lb., but bearing in mind that the heavier the hen the less eggs she is likely to lay, especially if the extra pounds are attributable to fat. The cock should weigh about 30lb. to 35lb. if in fair condition. I carefully avoid a bird of either sex that does not carry plenty of breast, and one that has a prominent nob on the point of breast-bone. Of course, freedom from any trace of disease or deformity is absolutely essential. One cock can be mated with eight to ten hens. Having selected your stock birds, get them settled in their permanent quarters as soon as possible. A large, roomy, but not draughty, open-fronted shed is a good roosting-place, although an ideal position is a tree selected by the birds themselves in a park. But few breeders are able to allow this owing to risk of losing them by thieves, either two or four legged.

When the hen, which is a particularly shy and timid bird, is looking for a nesting place, convenient places should be made up for her near at home to select from. An old barrel lined with leaves and straw, a thatched hurdle or two placed in odd corners, or a few boughs placed against a wall all make excellent places for her to creep under and lay her eggs, which number from about 13 to 35 each batch. It is always advisable to collect the eggs as laid, and to hatch the first batch under ordinary hens, breaking the turkey hen of her broodiness as soon as noticed, when she will re-commence laying in from ten days to a fortnight. Collect these eggs as previously, but the turkey hen may be allowed to hatch them herself, and her motherly care will be of great assistance to her brood in chilly autumn.

An ordinary hen will not cover more than nine turkey eggs, so it is advisable to put three hens down at once, and then at hatching time you should have two good broods. A turkey hen will cover from 15 to 25 eggs. A quiet place, not too light, should be selected for the hens to sit in. Great care must be taken that the nests are carefully made and kept clean and free from

vermin, that the hens have plenty of room, and that they, too, are kept free from vermin. The period of incubation is twenty-eight days. During hatching time the hen should be disturbed as little as possible, for fear of her trampling on the chicks, which are exceedingly weak and feeble when first hatched. Remove the empty shells and allow the hen to come off and feed only if restless. It is best to try and arrange to give her a good feed before the first chick is hatched. Turkey chicks hatch very rapidly and cleanly if the eggs are fresh, a whole hatch coming off in five or six hours. The newly hatched chicks should be left in the nest thirty-six hours, after which time they should be quite strong. Remove hen and chicks to a large, dry, well-ventilated coop with wire-covered run in front and board floor covered with dry chaff or peat moss if early in the season. The coop and run should be placed in a sheltered corner, where plenty of good grass and herbage are obtainable.

The chicks' first food should consist of hard-boiled egg chopped fine and dried off with ground oats or crammings. This food may be given for the first four or five days, varying it with an occasional feed of biscuit-meal and a last feed at night of a reliable dry chick food. After the first few days the egg may be replaced by fine pollard, scalded and dried off with ground oats, or boiled rice dried off with crammings, these foods to be continued for the first three weeks. The chicks must be fed regularly and sparingly every two hours, and although it may not be apparent just now, overfeeding, mind, is fatal, and special attention must also be paid to the regular supply of water, flint grit, and oyster shell. After three weeks the interval between the feeds may be increased to three hours; green food in the form of chopped onions or dandelions may be added to the soft food, which may be mixed with skimmed or new milk. Cracked wheat or groats may replace the dry chick food. Vary the foods as much as possible, but do not make any sudden changes. Move the coop and run on to fresh ground daily, and when space and weather will permit allow the hen to roam about with her chicks after the first week. The hen and chicks should be periodically examined to see that they are all quite free from vermin, which are the cause of many fatalities.

This system of feeding should be continued till the chicks have "shot the red," which they do when from eight to ten weeks old. About this time the hen will be thinking of leaving her rapidly growing chicks, so they should all be moved to a nice dry, well-ventilated but warm house about 8ft. by 6ft., and 6ft. high at ridge. No perches should be allowed, the floor should be covered with clean dry wheat straw, and here the chicks should be warm enough when the hen forsakes them. They will now only require four feeds a day. Do not drop off the onions, which give tone to the system. Their evening food may now be whole wheat or good heavy white oats, and as soon as a field of corn is cut and carted the turkeys should be moved on to the stubbles without delay, and the house moved daily, when they will only require two and probably one feed a day, and their growth will be amazing. Keep them on the stubbles as long as there is any corn for them to pick up, or until the ground gets wet and cold; they must then be moved to their winter quarters, and for this purpose nothing beats a good barn.

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THE EGG-LAYING COMPETITION.

Commenced May 1, 1909. To close April 30, 1910.

Following are the results up to June 30:—

The figures in black indicate the winners of the monthly prizes.

The first column of figures indicates the present position of the pens in the competition.

FOWLS.

	Owner.		Breed.		May.	June.	Total.
1	D. Mildren (S.A.) .. ..	..	White Leghorn	..	106	102	208
2	A. W. Green .. ..	..	White Leghorn	..	109	98	207
3	C. B. Bertelsmier (S.A.) ..	..	White Leghorn	..	90	113	203
4	M. Love .. ..	..	White Leghorn	..	90	112	202
5	E. E. Ranford .. ..	..	Black Orpington	..	76	118	194
6	Craig Bros. .. ..	..	Black Orpington	..	67	119	186
7	Sunnyhurst Egg Farm (S.A.)	..	White Leghorn	..	107	79	186
8	Gwalia Pen .. ..	..	White Leghorn	..	93	92	185
9	Lionhurst P.F. .. ..	..	White Leghorn	..	85	94	179
10	J. E. Pryke .. ..	..	White Leghorn	..	93	82	175
11	A. L. Ballantyne .. ..	..	White Leghorn	..	66	107	173
12	Mrs. S. Dixon .. ..	..	White Leghorn	..	106	67	173
13	Mrs. M. Kynaston .. ..	..	White Leghorn	..	98	63	161
14	South Perth P. F. .. ..	..	White Leghorn	..	89	71	160
15	Mrs. A. Robinson (No. 1) ..	..	White Leghorn	..	107	51	158
16	Cæsar and Geddes .. ..	..	White Leghorn	..	105	51	156
17	Greenville P. F. .. ..	..	Silver Wyandotte	..	112	41	153
18	F. Whitfield .. ..	..	White Leghorn	..	75	76	151
19	Bert. O'Shannassy .. ..	..	White Leghorn	..	79	67	146
20	J. Faulkner .. ..	..	White Leghorn	..	75	64	139
21	Mrs. A. Robinson (No. 2) ..	..	White Leghorn	..	80	57	137
22	W. H. Wright .. ..	..	White Leghorn	..	58	77	135
23	Mrs. L. Mellen .. ..	..	White Leghorn	..	91	42	133
24	R. L. Martin .. ..	..	White Leghorn	..	94	36	130
25	Greenville P. F. .. ..	..	White Leghorn	..	47	83	130
26	Jack R. Parkes .. ..	..	White Leghorn	..	75	62	127
27	Mrs. A. E. Kinnear (S.A.)	..	White Leghorn	..	66	59	125
28	E. E. Ranford .. ..	..	Minorca .. ..	..	40	83	123
29	Jack R. Parkes .. ..	..	White Leghorn	..	65	43	118
30	S. W. Stewart .. ..	..	White Leghorn	..	67	43	110
31	Sunflower P.F. .. ..	..	White Leghorn	..	53	52	105
32	Stephen Craig .. ..	..	White Leghorn	..	46	57	103
33	Austin and Thomas .. ..	..	White Leghorn	..	45	57	102
34	Wilson and Cæsar .. ..	..	White Leghorn	..	51	51	102
35	A. H. Padman (S.A.) .. ..	..	White Leghorn	..	83	15	98
36	Belmont P.F. .. ..	..	White Leghorn	..	38	58	96
37	Mrs. E. Douglas .. ..	..	Black Orpington	..	31	52	83
38	H. Hunter .. ..	..	Plymouth Rock	..	46	34	80
39	E. E. Ranford .. ..	..	Brown Leghorn	..	29	50	76
40	Stafford Bros. .. ..	..	White Leghorn	..	58	15	73
41	C. L. Braddock .. ..	..	White Leghorn	..	28	47	75
42	C. W. Johnson .. ..	..	White Leghorn	..	36	23	59
43	Carlowrie P.F. .. ..	..	Brown Leghorn	..	12	38	50
44	F. S. Squires .. ..	..	White Leghorn	..	20	26	48
45	J. Faulkner .. ..	..	Golden Wyandotte	..	16	27	43
46	White Wings P.Y. .. ..	..	White Leghorn	..	33	4	37
47	White Wings P.F. .. ..	..	Black Orpington	..	7	27	34
48	Mrs. E. Small .. ..	..	British Game ..	..	15	11	26

3,158 2,896

Winner of first monthly prize, Greenville P.F., Silver Wyandottes, 112; second month, Craig Bros., 119.



WESTERN AUSTRALIAN COURT, FRANCO-BRITISH EXHIBITION, — Part of Annexe.

DUCKS.

	Owner.		Breed.	May.	June.	Total.
1	P. Lyons .. ..	..	Indian Runner ..	159	164	323
2	Simplex Incubator Factory ..	..	White Indian Runner ..	114	148	262
3	G. Thomson .. ..	..	Indian Runner ..	106	155	261
4	H. Carr .. ..	..	Indian Runner ..	93	113	206
5	D. Vincent .. ..	..	Indian Runner ..	47	156	203
6	White Wings P.F. .. ..	..	Buff Orpington ..	52	86	189
7	South Perth P.F. .. ..	..	Indian Runner ..	43	134	177
8	Carlowrie P.Y. .. ..	..	Indian Runner ..	59	111	170
9	C. W. Johnson .. ..	..	Indian Runner ..	87	56	143
10	P. O'Connor .. ..	..	Indian Runner ..	9	119	128
11	A. Pratt .. ..	..	Indian Runner ..	60	23	83
12	J. T. Johns .. ..	..	Indian Runner ..	30	45	75
13	Mrs. Ginder .. ..	..	Indian Runner ..	14	48	62
14	White Wings P.F. .. ..	..	Indian Runner ..	103	5	57
15	Greenville P.F. .. ..	..	Indian Runner ..	24	32	56
16	Jack R. Parkes (No. 2) .. ..	..	Indian Runner ..	29	25	54
17	Rowenhurst Pen .. ..	..	Indian Runner ..	3	44	47
18	Greenville P.F. .. ..	..	Pekin	2	36	38
19	Jack R. Parkes (No. 1) .. ..	..	Indian Runner ..	14	0	14
20	F. Whitfield .. ..	..	Indian Runner ..	5	0	5
21	K. Becker .. ..	..	Indian Runner ..	4	1	5
22	Mrs. Ginder .. ..	..	Aylesbury	0	2	2
23	Mrs. E. Small .. ..	..	Pekin	1	0	1
24	Mrs. L. Mellen .. ..	..	Indian Runner ..	0	0	0
				1,058	1,534	

Winner of first monthly prize, Mr. P. Lyons, Indian Runner, 159; second month, Mr. P. Lyons, 164.

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- Annual Report, Surat Agricultural Station, 1907-08.
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 Farmers' Foes and their Remedies, Department of Agriculture, British Columbia.
 Seventh Annual Report, Bureau of Science (Manilla).
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 Agricultural Journal of British East Africa.
 Report Maine Agricultural Experimental Station, 1908.
 British Trade Journal (June).
 Australian Official Journal of Patents.
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 Locust Destruction in South Africa, 1907-8.
 Report of Dairy and Cold Storage Commission (Eng.), 1908.

BEE-KEEPING : STARTING COLONIES.

(By LEO. E. GATELEY, in *American Bee Journal*.)

Though this is hardly a suitable occupation for those seeking unnaturally large and immediate financial profits, still, if intelligently followed, it will in many localities be found as remunerative as any business of similar nature. It requires, however, a steady hand and a complete knowledge of every feature of the work. Being qualified for the business, if the locality proves good, the remuneration is sure after a sufficient number of colonies have been acquired.

The number of colonies necessary to insure the beekeeper a living income, depends upon the man, upon the methods employed, and upon the location. Though during the past season the man having 50 colonies in his back yard has realised as much as the average farmer, such years are the exception, and on account of off years, it would be safer to double that number before depending upon them wholly. Again, these figures relate to the comb-honey producers. Run for extracted, something above 100 colonies might possibly be needed.

While there is small question but that a few colonies kept as a side line usually pay well for the small amount of labour their care demands, the profits from such apiaries are extremely small compared to what the same bees would do in the hands of an expert and under intensive methods. In a small apiary there is never the chance to put in use many of the economic practices the extensive beekeeper generally finds lying close at hand. Certain it is that the need for specialisation has been discovered by a few, and its efficiency demonstrated.

In a recent issue of one of the bee-papers, the editor speaks highly of poultry-keeping being admirably adapted as a side-issue for honey-producers. Unless raising fancy stock, the annual profit from a hen is usually estimated at about one dollar. For comparison, let us say that the labour required to care for a hen is equal to that for a colony of bees, although, in reality, it is about six times as great. At this rate, in our locality, a colony of bees kept in a log-gum will return a profit five times that of the hen, or if in a modern hive, with skilful management, the bees will hold their own if a crop is secured once in 20 years.

Few there are who have urged specialisation but have pointed out the fact that a suitable location is absolutely necessary. For this reason, beginners should never start with more than a few colonies, and accurately ascertain the resources of their locality before investing largely. Even with poor management, fair returns may occasionally be had in a first-rate locality, but where there is no pasturage the highest knowledge comes to naught. Seldom does our locality furnish the enormous yields sometimes produced in a few highly favoured spots, but its stability, and an immunity from bee-diseases, make it fairly suitable for specialisation. During the number of years in which I have kept bees in this State a total failure of the nectar supply has been unknown.

Not all localities are adapted to exclusive beekeeping, and where this applies, great results should never be anticipated from a small apiary kept as a side-issue; for where good returns can be had, specialisations will generally be found desirable.

Complaint is frequently made that through encouraging beginners, danger may be found in some inexperienced person jumping to a hasty and erroneous conclusion that the bee-business is a broad avenue to easy fortune. No advocate of specialty has, however, to my knowledge, even remotely suggested wisdom in such policy. For the experienced beekeeper, properly situated, the advice so often given to eliminate all entangling side-issues, is sound logic.

Without thorough preparation united with some practical experience, the one who invests heavily in bees, expecting to make of them a sole dependence, is foredoomed to almost certain disappointment. Moreover, his experience counts for little if it has been with obsolete methods.

The present-day beekeeper has greater possibilities of living a happy and prosperous life than he ever had before. Still there remains one thing that is absolutely essential to real success, and that is some knowledge of the modern conditions that affect apiculture.

SEA ISLAND COTTON INDUSTRY.

VALUABLE INFORMATION FOR GROWERS.

(By THOMAS THORNTON, A.R.C.S., in *West Indian Bulletin*.)

The history of the Sea Island cotton industry in the West Indies is of very great interest because of the rapid progress that it has made. The improvement in the methods of cultivation that have been adopted, as the acreage extended, has also been most marked.

In six years cotton has grown to become a very important industry in many of the West India Islands, and has been the means of considerably improving the financial position of many of these colonies.

Cotton was first planted on a commercial scale in the year 1902, when about 400 acres were put into cultivation. In 1903 this area was extended to 4,000 acres, in 1904 to 7,000, in 1905 to 9,500, in 1906 to 14,500, and for the season 1907-8 20,000 acres are under culture in this crop.

There has been a general improvement in the quality of the lint produced, for the plants have become acclimatised, and at the same time the methods of cultivation and of preparing the product have received careful consideration. At the present time the West Indies can successfully compete with any country in the world in the production of Sea Island cotton, and, in some instances, exceptionally fine samples have been produced.

When cotton was re-introduced into the West Indies it was a new crop to all concerned. Managers of estates had to commence at the beginning, and

labourers had to be trained. It had to be determined what methods of cultivation were likely to be the most successful, and many experiments had to be given careful trial. To-day we have sufficient data available to be able to indicate, in general, what methods are likely to lead to successful cultivation. There are, however, several points in connection with cotton cultivation that have not yet been satisfactorily settled, and, therefore, we must continue with experiments for some time to come.

The following points have become established and are adopted by our best cotton planters:—

- (1.) All cotton lands should be well prepared.
- (2.) The land should be left for some time to mellow or cool out before planting is done.
- (3.) That it is most important that cotton lands be well drained.

Distances of Planting.

As regards planting great improvements have been made. Considerable attention is now given to the careful preparation of the land, and to the distances at which the seed is planted. In the earlier years it was thought by many that the greater number of plants to the acre would produce the greater yields, but now it has been fairly generally established that it is best to plant in single, straight rows, and where cotton is a rotation crop with canes, with the rows from five to six feet apart. The seeds, usually about four, are then planted at distances of from 18 to 20 inches apart in the rows.

Machines for planting purposes have been imported into Barbados and Antigua. At Dodds, Barbados, a machine has done very satisfactory work, and several planters have similar ones on order. The machine is drawn by a mule and can be regulated to drop any number of seeds at distances required. It opens the ground, drops the necessary number of seeds, and covers them over, and, if required, it can be arranged to drop artificial manures at the same time as the seed. It is estimated that about six acres per day can be planted by one of these machines.

Shedding of Cotton Bolls.

In some quarters the falling off of large numbers of young buds and bolls has been experienced. As many as half the bolls that should mature under normal conditions have, in some fields, been shed from the plants.

A bad attack of aphides during the time that the plants are rapidly forming flowers and bolls will cause many of them to be shed, and it has recently been brought to notice at Antigua that young flower buds which are being shed contain the maggot of a small fly. It has not, however, been generally experienced that the general shedding of bolls is due to insect pests or to fungus diseases, for it has been observed that the following causes may result in an abnormal amount of this shedding taking place:—

- (1.) Root pruning by deep cultivation.
- (2.) Surface of soil becoming hard and caked, or becoming covered with weeds.
- (3.) Excessive vegetative growth during the flowering period.
- (4.) Very heavy rains.
- (5.) Severe drought.
- (6.) Exposed position of the plants.
- (7.) Overcrowding of the plants.

It would appear, therefore, that the shedding of bolls is due to an abnormal physiological condition inside the plant, and that the question of moisture plays a considerable part in causing it to take place. To combat it, conservation of soil moisture and careful drainage should receive every consideration. It is very probable that constant stirring of the surface soil and good drainage will do much towards assisting the plants to mature the maximum number of bolls. In this connection the use of mule-drawn cultivators is likely to be of great service. They are extensively used for cotton in the United States of America, and have given great satisfaction in the cotton fields at St. Croix. They are at present being given a trial at Antigua, and it is possible that they will be experimented with in other islands.

Picking and Sorting of Cotton.

In the picking and sorting of cotton each year sees the work done more thoroughly. The spinners appear to be very satisfied with the manner in which the work is carried out. On some estates it has reached a high standard of efficiency, and there are now very few complaints of badly picked and prepared cotton being sent the spinners from the West India Islands.

Quality of the Cotton.

There are natural limits which serve to determine more or less the quality of the cotton produced. The rainfall and the character of the soil are perhaps the most important factors.

Cotton grown in the driest districts is short and of a coarse nature. That obtained from localities where the rainfall is greater is generally both longer and finer.

When the soil is of a heavy character and retentive of moisture, the cotton produced has a tendency to become very weak and wasty, particularly if the rainfall is high. If, however, the soil is fairly light in character and very porous, the quality of the cotton does not appear to suffer. In St. Vincent, where the soil is sandy and very porous, the cotton is very strong, even though the rainfall is very heavy for cotton localities. In fact no stronger cotton is produced in the West Indies than that of St. Vincent.

Quality of Various Pickings.

In most of the islands, owing to the presence of the leaf-blister mite, it is impossible to obtain more than one picking, but in Barbados, where this pest has not made its appearance, two, and sometimes even three, pickings have been obtained. The advisability of keeping plants to produce a third picking has occasionally led to important discussions. This last season there has been an opportunity to examine a number of cotton samples taken from individual plants from the first, second, and third pickings, and it has been found that in each instance the best cotton is obtained from the first picking. The length of the cotton is greatest at the first picking. It decreases at each subsequent picking. At the second picking there is less weak fibre present, but at the third, the weak fibre may be present to a very abnormal extent. The second picking is rather coarse and brittle, and the third is too soft, and as the spinner says, is lacking in "bone."

It is probable that the coarse and brittle nature of the second picking is due to the dry season in which it is grown, and the soft nature of the third picking to the degenerate character of the plant due to age.

It should be borne in mind that the spinner does not want weak and wasty cotton, and when an island commences to supply it, spinners who buy are apt to look with suspicion on the cotton produced in that island. Irrespective of the trouble brought about by diseases, the quality of cotton they are likely to produce should influence the planter when deciding whether he shall grow third picking cotton or not.

Seed Supply.

The question of the supply of seed for planting has been given careful consideration throughout all the islands.

In 1902 arrangements were made by the Imperial Department of Agriculture for a supply of Sea Island cotton seed through the United States Department of Agriculture. This was distributed for the planting of 1903.

Towards the end of 1903 arrangements were made by the Imperial Commissioner of Agriculture, when he and Mr. Bovell were visiting the Sea Island cotton-growing districts of America, for a large supply of the best Rivers' and Seabrook strains of seed. This was used for the 1904 planting throughout all the islands.

For the 1905 crop arrangements were being entered upon for a further supply from the Sea Islands, when information was received that the planters there were resolved not to sell their seed to "communities outside South Carolina." It was at first thought by West Indian planters that this was a hardship, but it has subsequently been demonstrated that it has really been advantageous to these islands, for the question of seed supply had to be very carefully considered and thorough selection practised. It was realised that some estates produced better results than others both as regards yields and the quality of the lint. The seed produced on these estates was therefore purchased. It was carefully hand picked, and all but the best developed seeds were discarded. In this way the seed for the 1906 crop was furnished, and contrary to the expectations, and perhaps, the wishes, of the South Carolina planters, the quality of the crop reaped was greatly superior to that obtained from the seed imported for the previous season from the Sea Islands.

Since 1906 the seed for general planting purposes has been obtained in this manner.

Seed Selection.

From the beginning it was recognised that the above method of obtaining seed for planting purposes could be improved upon.

Plants grown from seed vary to a greater or less extent from one another. If there is any variation in the first generation, each succeeding generation, which is produced from parents with varying characters, will become more and more varied. It was necessary, therefore, in order to obtain a good, uniform quality of cotton, to adopt a system of seed selection in which certain individual plants, selected for their good qualities, are made the starting point each year.

In the first year after the supply of American seed was cut off, experiments in plant selection were commenced on seven estates in different localities of Barbados. In the next year (1906-7), this work was extended to ten estates in Barbados, to five estates in St. Vincent, and to the Experiment Stations at Antigua, St. Kitt's and Monserrat. This year the work is again being

carried on throughout the different islands, and experiments have been commenced in the Virgin Islands.

The advisability of this careful selection work is now realised throughout all these colonies. The requirements of the spinner have to be considered and every effort made to produce that class of cotton that he desires.

One point which the spinner strongly emphasises is that the cotton must be uniform. A careful examination of cotton on the plants in the field shows that, although a large percentage of the different plants are producing a fairly uniform quality, yet there are some that produce a better, and others an inferior grade. When seeds are planted from an individual plant, a little variation will usually be found, but not nearly so much will be observed as when seed is taken from a general field crop.

Many plants also show a certain amount of resistance to disease, have a greater power to withstand adverse climatic conditions, are less liable to shedding of bolls, and they may produce a large yield of longer, finer, and stronger cotton.

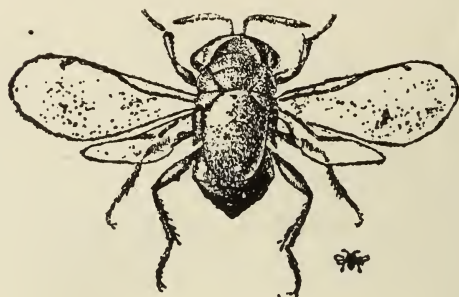
This principle of selection of individual cotton plants is already giving exceedingly promising results.

At one estate in Barbados, in 1905-6, three plants were selected as the most desirable types. Two of these appeared to be of a very promising nature. In 1906-7 they were propagated in a nursery, and sufficient seed was obtained from them to plant a considerable portion of the estate, and it is estimated that it will be possible from this crop to obtain more seed, directly descended from these three plants, than will be required to plant the total cotton area of Barbados.*

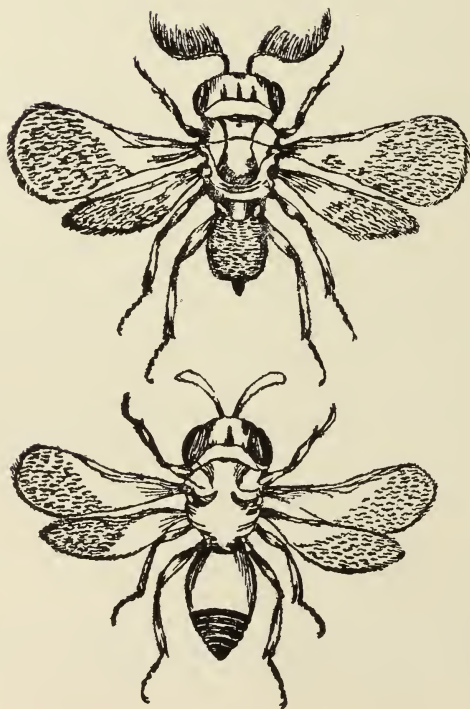
On another estate, situated in a district with conditions very different from that above mentioned, two plants were last season finally selected. The plants growing from the seed obtained from one of these appear to be exceptionally promising, and this strain will be tried on a commercial scale during the coming season.

By carrying out these experiments varieties of plants, especially suited to local conditions of soil and climate, will be obtained, and by making the best plant in the nursery, each year, a fresh starting point, a gradual improvement will take place. Instead of producing a crop with divergent characters, there will be, each year, a tendency for the quality of the lint to become more and more uniform. The proportion of weak fibre will be reduced, the length of staple and the proportion of lint to seed improved, and the general productiveness of the plant increased.

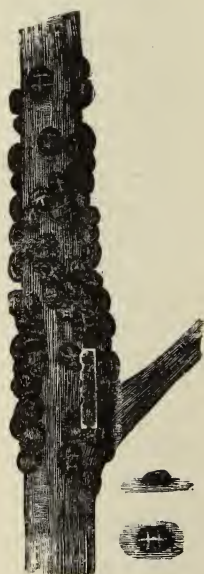
* Seven bales of cotton directly descended from one of these originally selected plants (No. 303—see *West Indian Bulletin*, Vol. VII., p. 159) have been reported upon by cotton brokers as follows:—
“It is the most serviceable class of cotton produced in the West Indies, and if it gives a better yield per acre than the finer descriptions—as it probably will—we think it is most suitable for extensive cultivation.”



Black scale parasite (*Scutellista cyanea*).



Black scale parasite.
(*Dilophogaster California*).
Male (upper) and female.



Black scale.
(*Lecanium oleae*.)

ADVANTAGES OF AN AGRICULTURAL LIFE.

(*Kansas Farmer.*)

Agriculture, unquestionably, is the noblest and most enjoyable occupation of man. It was formerly believed that farming was the most inferior of all callings, but such a belief is very unsound and far from the truth. When agriculture is thoughtfully considered, it will be found that for the development of useful men it affords the best advantages.

It is a fact worthy of note that the majority of the world's greatest soldiers and statesmen, men of letters, business, science, orators, and reformers have been reared in the country. A brief consideration of a few of the world's greatest men will prove this fact. Washington, who had very little schooling, lived in the country most of his life. The foundations for his future greatness were laid when he was a surveyor, gaining an accurate knowledge of the country and learning the habits and customs of the early settlers. "Agriculture," said he, "is the most healthful and the most noble occupation of man."

Russel Conwell, an eminent divine of Philadelphia, in one of his recent lectures said, "Eighty per cent. of the brain and brawn of our large cities is supplied by the country."

Soundness of health is indispensable for the successful man. The lawyer who sits all day in a crowded courtroom, and the student who works hard at his books, like all other great workers must have health to be successful. A man hampered by physical difficulties cannot accomplish much. Abundance of fresh air, freedom of exercise, sufficient sleep and freedom from bad habits and vice, all characteristics of country life, are conducive to a vigorous constitution. City air, filled with its germs, gas fumes and all other kinds of impurities was never meant for us to breathe. It is a fact well worth knowing that country air excites deep breathing, which strengthens the lungs, giving vitality and success. Dr. Barrow, of England, who has made this subject his life study says, "I venture to advance the proposition that the 'vital force' of the city dweller is far inferior to the 'vital force' of the countryman. The general unfitness and incapability of the dwellers of our large hives of industry to undergo continued violent exertion or to sustain long endurance of fatigue, is a fact requiring very little evidence to establish. It may be conceded as an established fact that the city man is, on the whole, constitutionally dwarfed in tone and his life, man for man, is shorter, weaker, and more uncertain than that of his country brother. The true causes of this deterioration are neither very obscure nor far to seek. They are bad air and bad habits."

Another important advantage of country life is that it affords an opportunity of acquiring the habits of industry. Idleness kills most town and city boys as men, while the country lad learns to overcome obstacles, forms the habit of economy, the first principle of business of any kind, and acquires that real stamina and perseverance which are the most valuable incitements to performing one's duty. This makes him better fitted for the struggles that come in later life. He learns to be independent and very seldom falls into

the habit of trying to get something for nothing, but cultivates that honesty which is so necessary for the growth of useful men.

The man who is thoroughly trained in agricultural subjects and returns to the farm has a marked advantage over the so-called professional man as far as making a living is concerned. The late President Harper of Chicago University once said in an address to the graduating class, "You who are now entering the world will find that poverty will be the strongest opponent to overcome. You who are entering life as lawyers need only look at the papers to-day to find that the average lawyer does not earn his salt. Those who become physicians will find that their only companion for a few years to come will be the wolf at the door; while those who go forth to teach need only to witness the struggles of the school teachers in this city. The school board is beset with howls and wails for an increase of salaries." While President Harper did not refer to the farmer directly, we are led to believe from the trend of his remarks that the farmer has a better chance to make a living than the lawyer, doctor, or teacher.

The country lad has an advantage over the city boy in that good morals are more easily formed in the country. The great evils of the city such as those of the tenement houses, where millions of poor children seldom see a blade of grass or play in the sunshine and fresh air, the bad habits the city boy is addicted to and his associations with the lowest class of criminals, are very poor factors in the making of useful men.

BRITAIN'S MEAT SUPPLIES.

THE FUTURE OF AUSTRALASIA.

An interesting paper was given by Mr. R. H. Hooker, M.A., before the Royal Statistical Society upon "The Meat Supply of the United Kingdom."

Indications show, said the lecturer, that the surplus available from North America has now about reached its maximum, and will before many years have passed tend downwards, its place being taken by the Southern Hemisphere. From Europe we are still deriving steadily increasing quantities of pig-flesh, and this will quite probably continue to increase for some years yet. The Southern Hemisphere, again, may be divided into two parts—South America, which is forging ahead fast, and Australasia, which is very possibly, so far as regards the average number of stock, nearly stationary (but fluctuating between enormously wide limits).

When America is Exhausted.

In saying that North America has about reached its maximum, Mr. Hooker did not wish to imply that no increase may be looked for in the near future; on the contrary, he anticipated that the present good prices will give

a stimulus to the cattle (and possibly pig) industry in the United States, and that in two or three years' time (perhaps less) we shall have a plentiful supply of meat thence, following, in fact, the next large maize harvest. But after that there should be a general tendency to decline, probably with considerable ups and down. The rapid increase in population must, at some not very remote period, require more and more of the surplus for its own needs. Canada should, of course, greatly develop her herds upon her vast north-western prairies, and we should for some time draw increasing quantities thence, and less from the United States. Later on the States will themselves make demands upon Canada, and our colony's meat will probably go to whichever (Britain or the States) pays best.

The Coming of the Argentine.

Taking the world over, added Mr. Hooker (whose criticisms afterwards could not see eye to eye with him on this point), sheep are pastured; and when grazing lands are transformed into arable, mutton disappears, and is disappearing fast everywhere (except in Australia). Cattle are naturally pastured as far as possible; but when cattle-grazing lands are transformed into arable the cattle are still raised on the arable land, though, of course, not so cheaply. With absolutely virgin land, rich in fertilising constituents, like the Argentine plains, wheat will be raised year after year without manure; but later on, with the exhaustion of the soil, manuring and rotations become necessary. At this latter stage cattle come in again, and thus we get corn and cattle developing together as in the United States. They are developing side by side in Argentina, where the areas are so vast that the two need not at present be inter-dependent.

For our mutton in future Australasia is the source to look to, and there is no reason why we should not have some from our African possessions, but the bulk will probably come from the Antipodes. The average consumption of mutton in Australia is put at nearly 100lb. per head (and possibly a lot of that is thrown away), or a total of, say, 420,000,000lb., and the country exports, say, 800,000,000lb., the two together making a total of a little over 1,200,000,000lb. With a sheep stock of only 85,000,000 this is but 14lb. in the year per sheep recorded as alive at the enumerations, whereas in the United Kingdom we found a sheep yield some 22½lb. per annum. Increased areas are also available in Australia, but their effect may possibly be rendered nugatory by the droughts, which are quite conceivably periodic. If so, with our increasing dependence upon Australia, the future should reveal some heavy fluctuations in supplies and prices of mutton (and wool). Mr. Hooker thoroughly believes that he will see beef plentiful again in two or three years' time. In the future our dependence on North America will steadily diminish and he looks to the Southern Hemisphere for our extraneous meat supply; mainly to South America for our beef, and to Australasia for our mutton, the latter probably exhibiting great fluctuations. Pig-flesh should come for a good many years from Europe and perhaps Canada.

THE VALUE OF SEAWEED.

Seaweed is often looked upon as a waste product of our seashores, but instead of being of little or no value, it is esteemed by those who have used it as a most valuable manure, either when used by itself or mixed with stable or farmyard stuff. All gardeners are aware of the utility of seaweed for dressing beds of asparagus, sea-kale, globe artichoke, and some other vegetable crops, but they do not seem to know that moderately used it has a most beneficial effect upon fruit trees, especially apples and pears, also upon grape vines.

It is true that some market gardeners residing near our seashores go to the trouble of gathering and carting on to their land small quantities of this material but an immense amount of it is allowed to be lost by being washed back again into the sea, to be covered up with sand, or allowed to rot on the beach and become offensive in many ways. In dry seasons it makes a really excellent mulching material perhaps better even than stable manure, and certainly better than many other things which are used. It is recorded that some land which had been reclaimed from the sea had been converted into a garden which grew excellent vegetables, flowers, and fruits. There was a great depth of sandy soil, and this was composed to a great extent of sand and decayed seaweed. It appears to be of more value in light than in heavy soils.

Apart from any manurial properties contained in seaweed, it is, like salt, moisture-holding, as well as feeding, the value and importance of which should not be ignored by those whose fruit trees are growing in very porous soils and where the rainfall is light. Fresh seaweed should not be buried near to the roots of established trees, neither should it be incorporated with the soil in forming a new fruit garden, but frequent mulchings of the surface ground, piecemeal, are a safe means of stimulating growth and sustaining the trees under the trying influence of a long drought. By this means it would gradually find its way into the lower ground, and undoubtedly improve its staple.

In many parts of Great Britain seaweed is assessed at its proper value. One illustration may be given. The gardens at Arundel Castle are widely celebrated for their extent, and the fine order in which they are kept. For a series of years heavy mulchings of stable litter were annually applied to the fruit trees, but it was found that the manure formed fine harbours for woodlice, earwigs, beetles, and weevils, as well as for sparrows and other birds; the fruits suffered in consequence, and the finest specimens formed the feeding ground at night of the numerous insect depredators. It occurred to the head gardener to use for a mulch seaweed. This was done, and now the fruit is large, bright, without a speck, and uninjured by any of the above-named pests. Occasional dressings to vines of seaweed are also recommended.

It has been stated that potatoes which have been manured with seaweed will stand a considerable amount of frost, while others, to which this had not been applied, were blackened and severely injured. It would seem that the soil for the time being had acquired a property equivalent to a certain degree of atmospheric temperature, or rather, that the nourishment absorbed by the

plants under such circumstances had enabled them to resist a degree of cold that would otherwise have destroyed them.

The fertility of the Isle of Jersey and the ability of the islanders to grow so much produce on a small area of ground are partly due to the large quantities of seaweed used there. Many kinds of fuci and algæ are thrown up on her coast, and there is, no doubt, a difference in the value of the numerous species, but there is no picking and choosing when the 'wrack' harvest begins. As much as 10s. per ton is often paid there for seaweed.

Seaweed varies considerably, some being far too coarse and heavy for the purposes mentioned, unless it has first had time for its partial decomposition. Preference is given to that of a finer and lighter character, which, collected, generally contains a fair amount of sand, making it more suitable in every way for use in the garden, whether it be for asparagus, fruit-trees, or even as a plunging material for pot-plants during the summer months. We have no statistics available respecting the comparative value of seaweed with farm-yard or artificial manures, and, as before stated, the value of the various kinds of seaweed must differ a little.

When burnt, and the ashes applied to the ground, it is good for all kinds of cereals. Seaweed is sometimes suffered to ferment before it is used, but this process is thought by some unnecessary, for there is no fibrous matter rendered soluble in the process, and a part of the manure is lost. A common plan is to mix it with stable manure, and let it lie for a while before using. The best results are generally obtained when used as fresh as it can be got. Some seaweed, which had been fermented, so as to have lost about half its weight, afforded less than one-twelfth of mucilaginous matter, from which it may be fairly concluded that some of this substance is lost in fermentation. The benefits of seaweed do not extend beyond one, or, at the most two, years.

In a bulletin of the United States Department of Agriculture, it is stated that in New England some of the best farms are largely maintained by the use of seaweed. It is partially dried on the beach before being carted on to the land, so as to reduce the weight, and consequent cost of conveyance, but it is not considered advisable to allow the weed to become quite dry, as it does not then readily decompose in the soil. Nor should it be allowed to ferment, or its manurial properties will be weakened. It is applied at the rate of from 20 to 30 tons to the acre; a ton containing about 80 per cent. of water, about 0.4 per cent. nitrogen, 0.7 per cent. potash, and 0.1 per cent. of phosphoric acid. Seaweed is therefore what is known as a potassic manure. It also supplies the soil with a large amount of humus, thus improving its physical properties. It is not, however, so well balanced as ordinary barnyard manure, and to get the best results it should be used in combination with a bone or phosphate manure; it has the great advantage in its freedom from weed, seeds, insects, and the germs of plant diseases. It is most valuable for potatoes, and is said to decrease scab in the tubers. There can be no doubt, therefore, that seaweed has a value as a garden manure, especially on sandy soils, and for leguminous crops. It should be wheeled on to the ground in the autumn, and dug in early. If mixed with barnyard manure it may be allowed to stay in a heap until the whole is rotten and fit for application in the spring. Generally, however, those who use it prefer to apply it in the autumn, so that it may have time to decay before the crops are planted in the spring.

--*Australasian*.

ROYAL AGRICULTURAL SOCIETY.

At the ordinary monthly meeting of the Council of the Royal Agricultural Society held on 13th inst., the president (Mr. T. H. Wilding) reported that a deputation had waited upon the Minister for Agriculture and requested that the Government should loan the society £14,000 at 4 per cent. on the security of the show grounds, and a favourable reply was given.

Improvements.

The grounds committee recommended the expenditure of £105 on improvements for the next show, to include the erection of a shade-house 60ft. by 40ft., in which to exhibit agricultural produce, vegetables, floriculture, etc.; increasing the area of grandstand enclosure; providing four additional 1,000 gallon tanks for rain water; removing the Press office to a spot near the secretary's office; and increasing the accommodation for sale sheep. The recommendation was adopted. The committee also reported that they had leased the show grounds for the Eight Hours Demonstration on October 25 next.

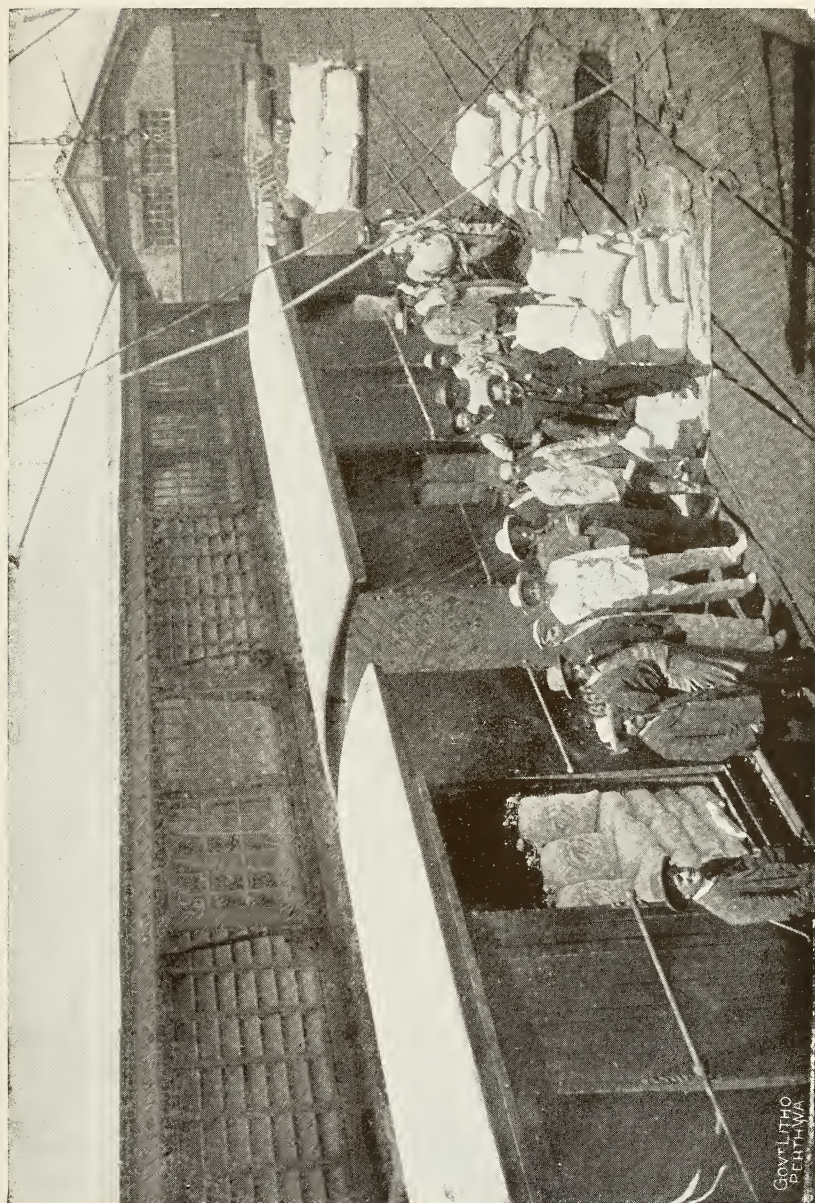
Registration of Stud Stallions.

In connection with the registration of stud stallions, the president reported that at the request of the Minister for Agriculture a committee had been appointed by the society to act with the Chief Inspector of Stock (Mr. Weir), and draw up recommendations to be embodied in a Bill to be introduced at the next session of Parliament. The matter had been brought under the notice of each member of the Council, and suggestions had been invited. The question of registration was said to be an important one, as all stallions at the society's horse parade, and also at the society's shows, would be subject to veterinary inspection for indications or symptoms of hereditary unsoundness. And unless all stallions passed this examination they would not be allowed to parade or compete at the shows. It was decided that it would not be compulsory for affiliated societies to carry out the veterinary examinations of stallions this year.

Governor-General's Prize.

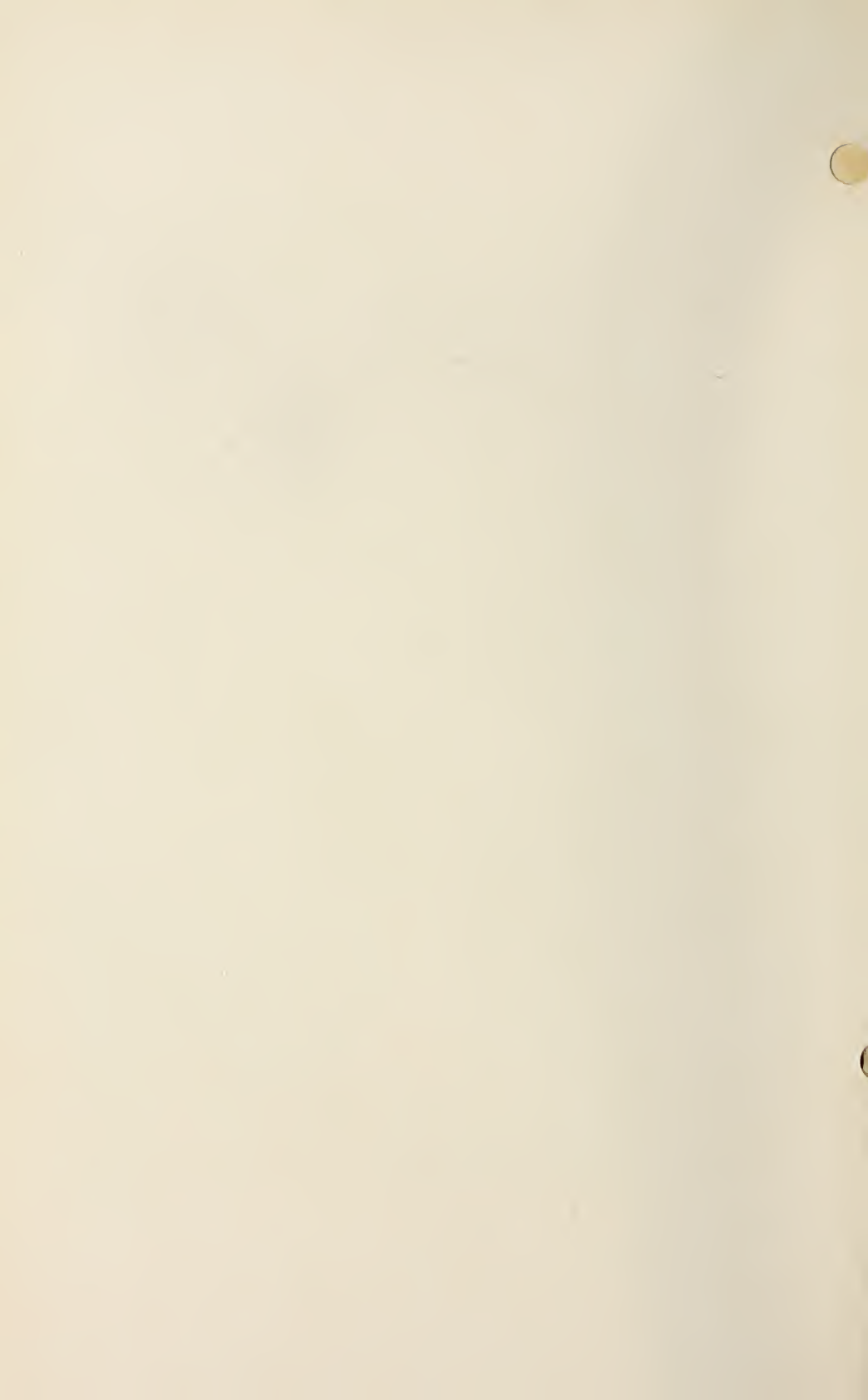
The Private Secretary to the Governor-General wrote intimating that it was His Excellency's intention to present a silver challenge cup to the society for competition in any class or section desired by the Council. It was decided to thank His Excellency, and to award the cup to the most successful exhibitor in the ring events. Special prizes were also received from Mr. H. J. Lukin, £3 3s. for best Shropshire ram, and £3 3s. for best Shropshire ewe bred in Western Australia; from Mr. J. G. Meares, £4 for buggy horse driven by lady; and from Mr. H. M. Rischbieth, £7 7s., for sires' produce stakes. It was decided to thank the donors.

It was resolved to add two additional classes in the cattle section for the next show, viz., shorthorn bull and shorthorn heifer under 12 months, and a request was received from an importer that the society should offer champion



WESTERN AUSTRALIA'S GROWING FOREIGN TRADE.

Shipping flour to Singapore from Eureka Mills, Cottesloe.



honours for exhibits of bacon, either imported or local; it was agreed to offer a card and ribbon.

The Fremantle Poultry Society wrote offering to pay one-third of the cost of importing a judge for the poultry sections at the next show; and the W.A. Kennel Club submitted an offer to pay half the expense of importing an expert to judge the dogs. Both offers were accepted with thanks.

The secretary (Mr. Theo. Lowe) reported having visited the Beverley and Canning societies, and stated that the Minister for Lands and Agriculture was having a Bill drafted to be presented at the next session of Parliament with the object of legalising the constitution of affiliation.

Next Horse Parade.

It was decided to invite His Excellency the Governor (Sir Gerald Strickland) to open the horse parade at 3 p.m. on August 18 next.

COTTON-GROWING AND WHITE LABOUR.

Subjoined is an extract from a letter written by a farmer at Capella, Queensland, and published in the *Peak Downs Telegram* of 5th June, which will be read with interest by those who desire to see the cotton-growing industry established in this State. It lends point to the contention of those who declare that there need be no qualms of fear regarding success in the cultivation of valuable staple cotton with white labour, provided the labour is efficient:—

“Our cotton crops point well to success. I took out eight little boys in the cart with me last Saturday, and put them on picking for two and a-half hours. Their average ages were twelve years, and their average performance at picking was 30lbs., and as I paid them the standard wage ($\frac{1}{2}$ d. per lb.) they earned 1s. 3d. each, equal to 4s. per day of eight hours. The best lad, aged fourteen, picked 43lbs., and the slowest, aged ten, picked 27lbs. Most of the boys had never seen a cotton bush before, and they were greatly hampered in not having larger bags, and a good deal of time was lost in weighing and unloading. Then, again, the crop is yet only half matured, and time was wasted in consequence. I gave the boys three runs to work, and each run they increased the weight by an average of 3lbs., so, according to that, I venture to surmise that, after a boy got going for a week or two, and developed confidence, he could double his earnings, and make over £2 per week. Mr. Rowan collected 96½lbs. in addition to losing considerable time in instructing the boys, in the two and a-half hours, so, after all, there should be a good thing in cotton gathering. The boys expressed delight at the day's outing, particularly the boys who gathered the most, as I gave a watch and chain for the best and 2s. 6d. for the next best. There are several other cotton crops here, and all are equally successful. I intend arranging for another trial gallop with the boys in a few weeks time.”

DATES OF AGRICULTURAL SHOWS.

The undermentioned dates have, under the constitution of affiliation, been fixed by the Royal Agricultural Society of Western Australia as governing body for the various agricultural shows during the year 1909:—

Northam, September 28 and 29.
Irwin, September 29.
York, October 5 and 6.
Greenough, October 6.
Beverley, October 8.
Pingelly, October 12.
Toodyay, October 13.
Geraldton, October 13 and 14.
Narrogin, October 14.
Wagin, October 19.
Katanning (National), October 21, 22.
Moora, October 22.
Kelmseott, October 25.
Williams, October 26.
Swan, October 27.
Murray, October 30.
Perth, Royal, November 2-6.
Kojonup, November 10.
Cannington, November 15.
Bridgetown, November 25.
Bunbury, January 12, 13.

GOVERNMENT LABOUR BUREAU.

JUNE REPORT.

Mr. James Longmore, superintendent of the Government Labour Bureau, reports for June as follows:—

Perth.

Registrations.—The total number of men who called during the month in search of work was 848. Of this number 384 were new registrations and 464 renewals, *i.e.*, men who called who had been registered prior to the month of June, and since July 1, 1908. The trades or occupations of the 848 applicants were as follows:—Labourers, 289; farm hands, 95; handy men, 67; handy lads, 52; carpenters, 47; cooks, 26; miners, 23; engine-drivers, 19; bushmen, 13; gardeners, 12; painters, 12; fitters, 11; bricklayers, 10; clerks, 9; grooms,

9; drivers, 7; seamen, 7; hotel hands, kitchenmen, and ironmoulders, 6 of each; blacksmiths, 5; shearers, 5; hairdressers, orderlies, plumbers, and stonemasons, 4 of each; bakers, boilermakers, firemen, grocers, quarrymen, and tailors, 3 of each; bootmakers, boilermakers' assistants, butchers, drovers, lads for farms, mechanics' labourers, orchard hands, storemen, sleeper-hewers, sawmill hands, and wheelwrights, 2 of each; and 56 miscellaneous.

Engagements.—The engagements for the month totalled 313. The classification of work found was as follows:—Labourers, 124; bushmen, 33; sawmill hands, 22; farm hands, 21; carpenters, 20; handy lads, 13; quarrymen, 10; engine-drivers, 8; cooks, 6; handy men, 6; lads for farms, 5; yardmen, 5; kitchenmen, miners, and stonemasons, 4 of each; blacksmiths, 3; bricklayers, boilermakers, canvassers, gardeners, hairdressers, orchard hands, sailors, and woodcutters, 2 of each; and 9 miscellaneous.

Fremantle.

Registrations.—The new registrations were 175, and the renewals 14, total 189. The classification was, viz.:—Labourers, 142; carpenters, 8; handy men, 5; shipwrights, 5; engine-drivers, 3; strikers, 3; blacksmiths, miners, navvies, plasterers, and sawmill hands, 2 of each; and 13 miscellaneous.

Engagements.—There were 29 engagements, viz.:—Labourers, 14; sawmill hands, 7; bushmen, 6; and blacksmiths, 2.

Northam.

Registrations.—There were in connection with this branch seven applicants for work, viz.:—Labourers, farm hands, and clearers, 2 of each; and a cook. There were three engagements—three clearers.

Kalgoorlie.

Registrations.—The applicants for work numbered 49. There were 23 new registrations and 26 renewals. The classification was:—Labourers, 19; handy men, 9; carpenters, 4; fitters, 4; engine-drivers, 3; miners, 3; barmen, blacksmiths, and handy youths, 2 of each; and 1 groom.

Engagements.—The engagements were four, viz.:—Labourers, 2; fitters and handy men, 1 of each.

The female servants who called numbered 25. The new registrations were 13 and renewals 12. The classification was:—Generals, 7; waitresses, 5; cooks, 5; housemaids, 3; light generals, 2; laundresses, 2; and one useful girl. There was one engagement—a waitress.

Women's Branch, Perth.

Registrations.—During the month there were 75 new registrations and 79 renewals, total 154. The classification was:—Laundress-charwomen, 32; housemaids, 26; generals, 24; cooks, 22; useful girls, 11; housekeepers, 10; light generals, 10; lady helps, 6; nurse-needlewomen, 5; waitresses, 3; married couples, 2; pantrymaids, 2; and one shop assistant.

Engagements.—There were 62 engagements, classified as follows:—Laundress-charwomen, 27; generals, 21; useful girls, 3; light generals, 3; lady helps, 2; housekeepers, 2; house parlourmaid, housemaid, nurse, and cook-laundress, 1 of each.

General Remarks.

The number of individual men who called at the central office, Perth, during the month in search of work was 848. This total is 182 in excess of that for June last year. The engagements for the month were 313, which is 116 more than that for June, 1908. During the month there were 124 men assisted by railway passes from the central office, Perth. The fares refunded totalled £52 18s. 1d., and the sum of £11 7s. 5d. was received from employers for payment of fares to send workers, the whole amounting to £64 5s. 6d.

The annual report of the Labour Bureau for the year ending 30th June, 1909, will be submitted at an early date. As customary, the report will contain information regarding the general condition of the labour market throughout the State. This information has been supplied by magistrates and secretaries of the various agricultural and kindred societies.

MARKET REPORTS.

GENERAL SUMMARY.

FARM PRODUCE.

The chaff market has not shown any material change; supplies have come to hand freely, but the demand has not been in equal proportion. Wheaten has realised £4 15s. f.a.q., and ranged to £4 2s. 6d.; damaged medium, £3 2s. 6d.; good medium, £3 15s. and £3 17s. 6d. Prime oaten chaff, £4 15s. and £4 10s.

Prices in wheat, 4s. 11½d. and 4s. 10d. Oats, 2s. 5d. and 2s. 4½d.

LIVE STOCK.

Good business as a rule has prevailed, with good demand for all description of stock. Country sales have been well attended, and keen competition exhibited for sheep. The following prices have been reported:—Wethers, 15s., 14s. 3d.; ewes, 15s. 6d., 13s. 5d.; hoggets, 14s., 11s. 6d., 10s. 7d., 9s.; fat wethers to 19s. 6d.; fat crossbreds, 17s. 6d.; ewes with lambs, 17s.

Pigs.—Business not very brisk. Porkers, 27s., 21s.

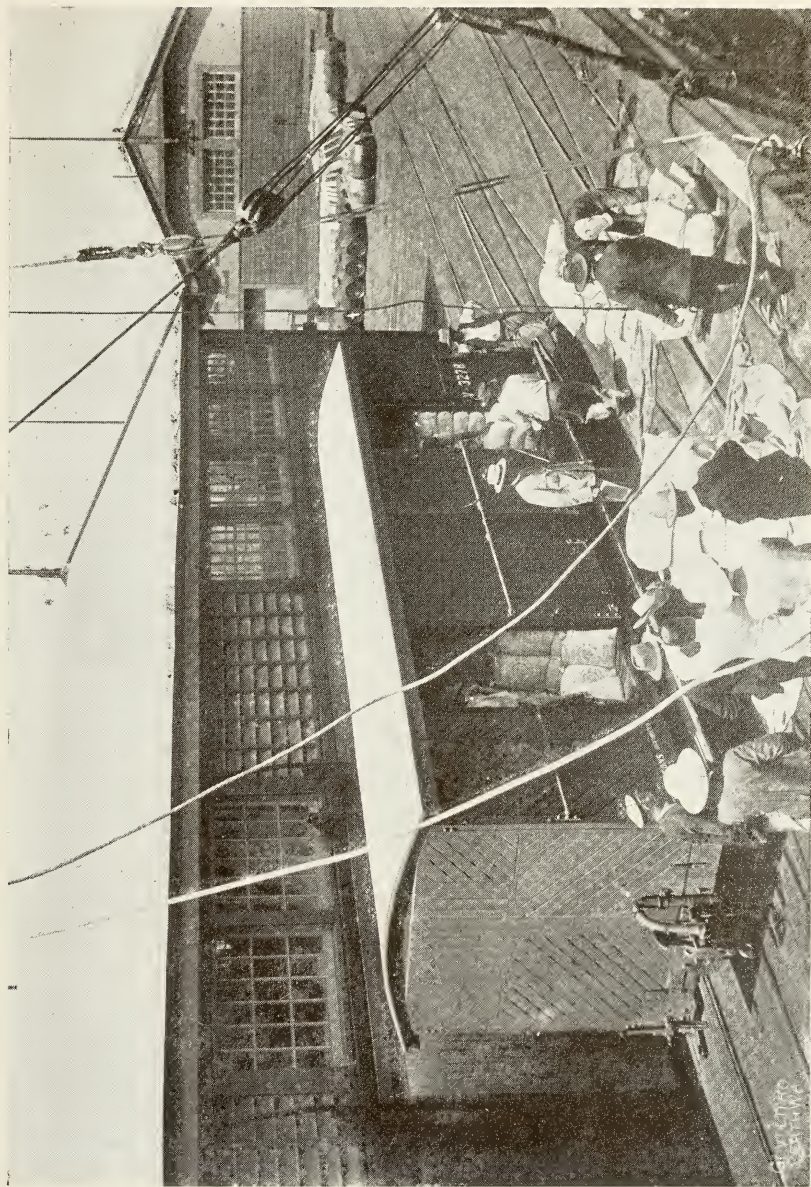
Dairy cows, £8 to £15.

Light horses, £8 to £15; heavier horses, £15 to £35.

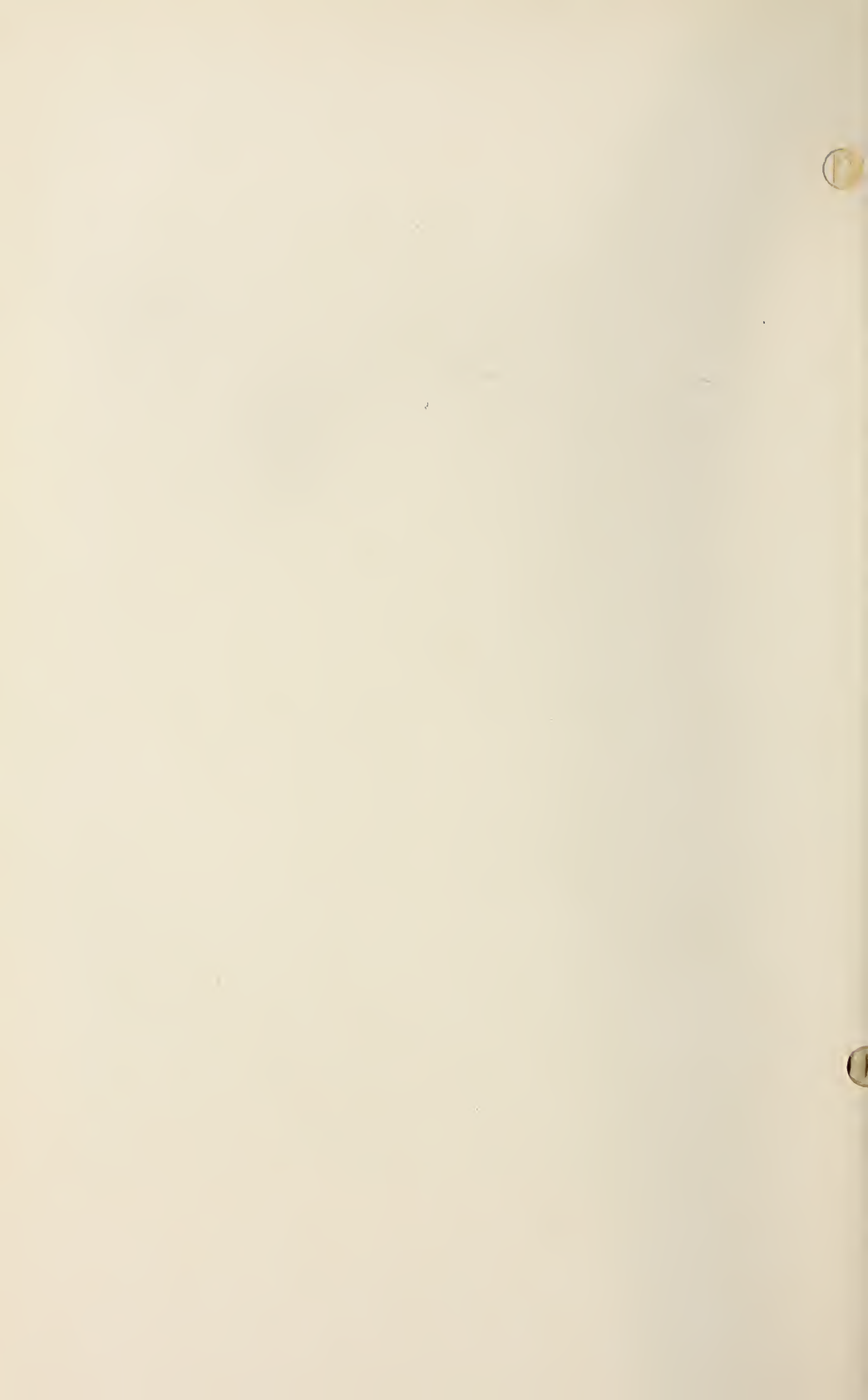
FRUIT, VEGETABLES, AND POULTRY.

Satisfactory prices have been maintained in all lines, and supplies have been in good proportions. The following are quotations:—

Fruit.—Apples, Rome Beauties, 6s. to 9s. 6d.; Cleopatras, 6s. 9d. to 7s. 9d.; Nickajacks, 6s. 6d. to 9s. 6d.; Stone Pippin and Sturmers, 5s. 9d. to 7s. 9d.; Rymers, 6s. 6d.; Improved Yates, 9s. 3d. to 11s.; Yates, 8s. 6d. to 9s.; Dunn's Seedlings, 4s. 9d. to 7s.; Rokewoods, 7s.



WESTERN AUSTRALIA'S GROWING FOREIGN TRADE.
Flour from Eureka Mills, Cottesloe, for Singapore.



3d. to 8s. 6d.; Shockleys, 7s. to 9s. Pears, Le Inconnue, 5s. 9d. to 7s.; Keiffers, 9s. 9d. to 11s. 6d.; Josephines, 9s. 6d. to 11s. Lemons, 4s. to 6s. 6d. Navel Oranges, 7s. to 10s. 6d.; St. Michaels, 6s. to 6s. 6d.; Queen's, 5s. 6d. to 6s. 6d.; others, 3s. to 6s. 3d. Mandarins, Emperors, 7s. to 8s.; Glen Retreats, 7s. to 9s. 6d.; Thorny, 6s. 6d. to 9s. Citrons, 1s. 9d. Tomatoes, 1s. to 6s. 3d.

Vegetables.—Cabbage, 2s. to 8s. 3d.; savoys, 5s. to 7s.; red, 11s. Pumpkins, I.B., 4s. 3d. to 6s.; bugle, 2s. 9d. to 3s. Swedes, 4s. to 4s. 9d. Parsnips, 1s. to 1s. 7d. Carrots, 11d. to 1s. 10d. Beet, 6d. to 11d. Turnips, 5d. to 1s. 8d. Rhubarb, $\frac{3}{4}$ d. to $1\frac{3}{4}$ d. Celery, 3d. to 3s. 3d. Lettuce, 3d. to 1s. 9d. French beans, $3\frac{1}{2}$ d. Peas, $3\frac{1}{2}$ d. Cauliflowers, 1s. to 7s. 9d. Potatoes, 7s. 6d. to 15s. 9d.

Poultry.—Hens, 3s. 3d. to 6s. 6d.; cockerels, 3s. 3d. to 7s. 6d. Ducks, 5s. to 5s. 9d. Muscovys, 6s. to 6s. 9d. Turkeys, hens, 9s. Pigeons, 1s. 4d. Eggs, 1s. 5d. to 1s. 6d. Lamb, 5d. to $5\frac{1}{2}$ d.

MELBOURNE PRODUCE MARKET.

Melbourne, July 14.

Wheat, 5s. to 5s. $0\frac{1}{2}$ d. Flour, £11 10s. Bran, 11d. Pollard, 1s. $1\frac{1}{2}$ d. Oats, 1s. 8d. to 2s. Maize, dry, 4s. 1d.; soft, down to 3s. 8d. Peas, 4s. 6d. to 4s. 8d. Chaff, £2 5s. to £3 5s. Potatoes, £4 to £4 15s. Onions, £6 to £6 10s.

ADELAIDE PRODUCE MARKET.

Adelaide, July 14.

Wheat continues inactive, with prices fairly nominally around 5s.; scarcely any business passing. Flour is steady at £12 for export. Bran, $11\frac{1}{2}$ d. Pollard, 1s. $1\frac{1}{2}$ d.

AUSTRALIAN WHEAT EXPORT.

Exports of wheat and flour from Australia to oversea countries since the middle of December last till the 26th ult. are officially stated at 27,383,317 bushels wheat and 839,259 sacks flour, or a wheat equivalent of 31,411,760 bushels, valued at £6,233,000, as against 10,928,615 bushels, value £2,149,000, during the same period of the previous year. The shipments from each State are given approximately as follow:—

	Wheat.	Flour.
	Bushels.	Sacks.
Western Australia	530,000	7,342
New South Wales	3,245,748	133,000
Victoria	12,062,383	428,667
South Australia	11,545,146	270,250
Total	27,383,317	839,259

LONDON MARKETS.

Messrs. Dalgety & Co. have received the following reports, under date London, July 15:—

Wool.—At the colonial sales yesterday a good selection was offered, and competition was more animated, American buyers operating freely.

Prices for good merinoes and crossbreds and other sorts were firmly maintained, but heavy, earthy, and wasty greasy merino wools and scoured faulty merinos are 5 per cent. to 10 per cent. lower as compared with last series' closing rates. Quotations for leading brands are, 8 $\frac{3}{4}$ d., 11 $\frac{5}{8}$ d., 12 $\frac{1}{4}$ d., 12 $\frac{5}{8}$ d., and 15 $\frac{1}{4}$ d.

Wheat.—The shipment of 21,453 bags which left South Australia by the brig *Gretchen Hartrodt* on April 28, has been sold at 45s. 1 $\frac{1}{2}$ d. The visible supply of wheat in America east of the Rockies is 14,699,000 bushels.

GARDEN NOTES FOR AUGUST.

BY PERCY G. WICKEN.

As soon as the heaviest of the winter rains have passed over, and the weather becomes a little warmer, preparations should be made to plant as many of the summer vegetables as possible. In most of our country districts where water for irrigation is not available the success of the crop depends on the plants making an early start and getting a root-hold of the ground before the weather becomes hot, consequently all the spring-sown plants should be planted in the various districts as soon as danger from frost is over. In the Geraldton district many plants can be grown all the winter which cannot be planted in the more southern districts until September, and settlers in this district are enabled to secure the early markets and also obtain the best prices. In the more southern districts, where it is not possible to obtain the early crops, it will often be found profitable to wait and delay the sowing as late as possible, so as to have the crop coming in late when the rush of supplies is over. Vegetables sent to market in the middle of the season, when there is a surplus of supplies, often fail to yield profitable returns. Those who are attempting to grow peas or beans on a poor soil would do well to obtain a packet of the nitrogenous bacteria, which can now be purchased in Perth, and inoculate the seeds with it. Although this bacteria has not done all that was claimed for it, it has in many instances, on poorer soils, given a greatly increased crop; but in soils already well supplied with nitrogen it has had but little effect.

Well-rotted manure should be dug into the ground so as to be prepared for planting out from the seed-beds whenever the plants are ready. A rotation of crops is as necessary in the garden as on the farm, and the same plants should not be sown on the same ground for two seasons running.

Asparagus.—As soon as the plants begin to shoot they should be planted out in land that has been previously prepared by digging about 30 inches deep



Young Orange Trees, Hawter's Nursery, Harvey, Western Australia.

and well mixed with stable manure. All damaged parts of the root should be cut off before planting, and the roots well spread out in the soil, and not bunched up together; cover with fine soil so that the crown of the plant is about two inches below the surface. Where beds are already established they should be covered to a depth of six inches with well-rotted stable manure, and give the bed a good supply of liquid manure; this will cause a fresh growth of thick white shoots.

Artichokes (Globe).—Plant out any suckers or young plants from the seed-bed. They require a rich or well-manured soil.

Artichokes (Jerusalem) can be planted freely this month. They are hardy, are a good wholesome vegetable, and if there is a surplus supply they are excellent for pigs. Plant in drills three feet apart, and about 18 inches apart in the drills.

Beans (French or Kidney).—In the warmer districts the plants will be well forward. They can be planted anywhere as soon as danger from frost is over. Obtain seed of good varieties, and plant out in rows 30 inches to 36 inches apart in land that has been well manured, and supply a little superphosphate with the seed.

Beet (Red).—Sow a little seed of the Globe variety to keep up a supply. The seed is better soaked for a few hours before sowing. Sow in drills about 18 inches apart and cover the seed with fine soil. When they come up thin plants out to one foot apart.

Beet (Silver).—May be sown the same as red beet, but only the leaves of this plant are used. This plant stands the dry weather well and yields a good number of leaves. The outside leaves are used as required.

Cabbage.—Put out as many plants as possible and sow a little seed for a further supply. Plant out in richly-manured land as they require plenty of food.

Carrots.—Sow a supply of seed in land which has been well manured for the previous crop. Sow in drills about 18 inches apart, and thin out when plants come up. The short-rooted varieties are the best to grow.

Celery.—Sow a little seed to keep up a supply. Plant out forward plants from the seed-bed in well prepared trenches. As the plants grow they should be earthed up to cause them to become white.

Cucumbers and Melons.—In warmer localities where there is no danger from frosts seeds may be sown in the open, but in cooler parts they will have to be raised under shelter.

Leeks.—Sow a little seed to keep up a supply, and plant out any seedlings that are available.

Lettuce.—Plant out all seedlings in well-manured beds, and give an occasional application of liquid manure to force them along; a little more seed may be sown.

Onion.—Plant out all the young plants you have available. The land should have been previously well manured and worked up to a fine tilth. Onion beds must be kept free from weeds or the young plants soon die off. Sow a supply of seed for future use. Large quantities of onions are imported and they always command a good price.

Parsnip.—Sow a few rows of seed to keep up a supply and thin out those already up.

Peas.—Sow largely of this vegetable so as to keep up a supply. Sow running varieties in drills three to four feet apart, and the dwarf kinds 18

inches apart and about four inches apart in the rows. The running varieties will require to be staked so as to keep them off the ground.

Potatoes should be planted extensively as soon as danger of frost is over. Particular attention should be paid to the seed that it is good and free from disease. As soon as the tops are a few inches high they should be sprayed with Bordeaux mixture, as this will help to keep the grubs in check. It is no use waiting until the crop is attacked before spraying, as it may then be too late. The losses from the attacks of the potato-moth grub are very serious.

Sweet Potatoes.—Prepare a seed-bed by taking off the top four inches of soil, then lay a number of tubers in this space and place the soil back again. In a few weeks' time the tubers will send out a large number of shoots, and these are broken off and planted out in prepared land. The land should be got ready for the shoots, and the best results will be obtained if they are planted on hills.

Tomatoes.—In warmer localities plants that have been raised in a seed-bed may be planted out, but farther south they will have to be kept under shelter. Seed may be planted in beds to put out later on. Only the best smooth-skinned varieties should be sown as these always command a ready sale.

PRUNING.

(*Horticulture and Viticulture*, by A. DESPEISSIS.)

Several objects are aimed at when pruning. It helps to control the growth of the plant and train it in such a way that the operations of cultivation, of treating and dressing the trees and vines whenever required, and of gathering the fruit, are made easier and less costly. It equalises the wood and fruit production of the tree, checking the one to favour the other if need be, suppressing rank growth of the boughs or limiting the productiveness of the plant in such a way that the quality is not affected by the excessive quantity of the fruit crop.

It checks the growth of suckers, water sprouts, and unsightly knobs and enlargements along the stem and branches; it tends to keep the plant in a thriving and healthy condition, promoting the growth of luxuriant foliage which tend to shelter the fruit and limbs from sunburn.

Pruning Outfit.

The tools required for pruning are few, but it is essential that they should be of the best quality and of a type suitable for the work to be done. It is also essential that they should be kept in good order, sharp and smooth, as a jagged or a blunt blade will inflict upon the wood bruises and injuries which will either cause the sap to sour and the limb to die back or will delay the healing of the wound, and thus leave a door open to the entrance of the fungi of canker and other moulds productive of rot and decay.

Secateurs, or pruning shears, are easier to handle than the pruning knife. They do the work quickly, neatly, and without giving a jerk to the branches of fruit trees and vines as does the pruning knife.

Cutting to a Bud.

It is important before cutting off a branch of a tree or a rod of a vine to make sure that the last bud left on the plant, and which is intended to prolong the growth of the plant, is a sound, plump one, likely to grow, or whether it has accidentally been rubbed off or otherwise destroyed. Such a terminal bud should be a leaf bud, and not a fruit bud.

Leaf buds differ from fruit buds in being more elongated, flattened, and more pointed in the same species of plants; they are either single, or give growth to single shoots, or double and even triple, when grouped in small clusters, two or three together, as in the case of stone fruits, they produce either leaves or branches.

Fruit buds are distinguished from leaf buds by their rounder and fuller form, the scales that cover them are broader, and they begin to swell and burst open earlier in the spring.

Fruit buds are also single, as in the case of apples, pears, quinces, or single, double and triple, as in stone fruits and berries. They are, besides, simple or compound; that is to say they produce but one flower, as in the peach, nectarine, almond, and apricot, or two or more flowers, in clusters, as in apples, pears, plums, and cherries.

All buds are leaf buds when first formed; some at a later stage develop, either by being allowed to mature naturally or by artificial means, into fruit buds. Many trees develop their fruit buds towards their terminal shoots, unless these are cut off, when those left at the base of the branch, or along it, are thus excited into growth, and transformed into lateral fruit buds.

When cutting to a bud a slight slant is generally given to the cut, at a place close to the bud, although in so doing it is advisable not to approach the bud too closely, nor on the other hand leave above it a useless stump, which might engender decay; a piece of wood about an eighth of an inch above the bud is sufficient to leave.

In the case of the grape vine the practice is often to cut through the joint, above the last bud it is intended to leave on the spur. A longitudinal section of the young wood of a vine shows in each joint a tubular cavity filled with pith; at each joint or node that tube is closed.

When Best to Prune.

For the winter pruning of deciduous trees, May, June, July, and August are the best months. Pruning may be started directly the wood is ripe, when the leaves fade and begin to drop off. It is recommended to give to apricots and cherries a preliminary pruning in the late summer, after the crop has been gathered. Trees thus pruned are less subject to gumming and dying back, and the leaf buds have thus more time to transform into fruit buds, and to perfect themselves.

Rainfall for the month of June, 1909, recorded at telegraphic stations in Western Australia, and averages.

Published by Authority under the direction of H. A. Hunt, Commonwealth Meteorologist.

STATIONS.	*Total for June, 1909, in points.	No. of wet days.	Average for June.	No. of Years Records.	STATIONS.	*Total for June, 1909, in points.	No. of wet days.	Average for June.	No. of Years Records.
TROPICS :					NORTH COOLGARDIE				
Wyndham ...	<i>Nil</i>	...	12	22	FIELDS :				
Turkey Creek ...	<i>Nil</i>	...	30	11	Sandstone ...	90	12	...	...
Hall's Creek ...	<i>Nil</i>	...	29	18	Wiluna ...	292	9	101	10
Fitzroy Crossing ...	<i>Nil</i>	...	59	15	Mt. Sir Samuel ...	115	4	99	8
Derby ...	6	1	67	23	Lawlers ...	101	6	130	12
Broome ...	188	7	122	19	Mt. Leonora ...	72	10	121	11
La Grange Bay ...	262	7	124	18	Mt. Malcolm ...	69	6	113	11
Wallal ...	339	7	125	11	Mt. Morgans ...	35	6	104	9
Condon ...	355	5	105	19	Laverton ...	96	7	118	9
Bamboo Creek ...	576	5	161	11	Murrin Murrin ...	62	5	121	10
Marble Bar ...	625	5	99	14	Yundamindera ...	107	7	92	8
Warrawoona ...	688	6	93	9	Kookynie ...	107	6	100	7
Nullagine ...	650	5	75	11	Niagara ...	150	6	138	12
Port Hedland ...	666	6	167	11	Menzies ...	233	7	140	12
Whim Creek ...	250	3	169	11	Mulline ...	133	9	112	7
Roebourne ...	125	4	124	22					
Cossack ...	160	5	119	27	COOLGARDIE GOLD-				
Fortescue ...	720	6	131	21	FIELDS :				
Onslow ...	553	8	169	23	Davyhurst ...	163	9	120	7
Winning Pool ...	509	10	247	11	Goongarrie ...	85	7	111	13
					Broad Arrow ...	109	8	118	11
WEST COASTAL :					Kurnalpi ...	73	5	118	12
Carnarvon ...	291	10	295	26	Kanowna ...	106	7	113	13
Sharks Bay ...	183	10	260	15	Bulong ...	88	6	108	12
Wooramel ...	167	9	233	10	Kalgoorlie ...	100	6	126	13
Hamelin Pool ...	130	12	198	23	Coolgardie ...	218	12	113	16
Northampton ...	468	12	480	27	Burbanks ...	214	8	110	10
Mullewa ...	204	12	233	13	Widgemooltha ...	197	11	132	11
Geraldton ...	486	12	463	31	Norseman ...	236	9	128	12
Greenough ...	425	10	511	27	Boorabbin ...	167	13	168	14
Dongarra ...	392	9	481	25	Southern Cross ...	262	11	136	19
Minginew ...	362	12	374	13					
Carnamah ...	348	10	320	21	S.W. COASTAL :				
Dandarragan ...	534	11	455	11	Gingin ...	697	11	614	20
Moora ...	456	12	377	11	Kalamunda ...	836	11	...	...
Walebing ...	474	12	380	25	Guildford ...	791	13	638	29
New Norcia ...	449	12	418	26	Perth Gardens ...	787	14	655	33
					„ Observatory ...	834	14	677	12
MURCHISON FIELDS :					Fremantle ...	942	15	580	31
Peak Hill ...	406	10	126	11	Rottneat ...	792	15	426	27
Abbotts ...	217	7	118	10	Rockingham ...	984	14	470	11
Gabarintha ...	124	7	118	9	Jarrahdale ...	722	13	548	29
Nannine ...	150	9	131	14	Mandurah ...	818	16	512	19
Cue ...	124	9	154	14	Pinjarrah ...	686	13	538	30
Day Dawn ...	92	6	139	13	Collie ...	377	11	478	9
Lake Austin ...	172	9	151	11	Brunswick Junct. ...	392	12	...	...
Lennonville ...	172	9	114	8	Bunbury ...	416	15	529	32
Mt. Magnet ...	218	5	130	14					
Yalgoo ...	213	9	160	12					
Murgoo ...	233	8	197	20					

*100 points=in.

RAINFALL—continued.

STATIONS.	*Total for June, 1909, in points.	No. of wet days	Average for June.	No. of Years Records.	STATIONS.	*Total for June, 1909, in points.	No. of wet days	Average for June.	No. of Years Records.
S.W. COASTAL—continued.					S.W. INLAND—continued.				
Donnybrook ...	444	13	555	8	Arthur ...	403	9	340	18
Busselton ...	1234	18	453	28	Wagin ...	487	10	307	18
Cape Naturaliste	890	19	517	5	Katanning ...	510	10	259	17
Karridale ...	470	21	634	15	Broomehill ...	523	11	275	18
Cape Leeuwin ...	843	23	549	12	Kojonup ..	434	3	341	24
					Greenbushes ...	487	14	664	16
S.W. INLAND:					Bridgetown ...	364	12	588	21
Kellerberrin ...	250	7	213	16					
Meckering ...	381	7	291	11	SOUTH COASTAL:				
Newcastle ...	521	8	392	29	Mt. Barker ...	353	14	374	22
Northam ...	434	10	316	28	Albany ...	533	16	537	32
York ...	412	9	330	32	Breaksea ...	453	16	445	19
Beverley ...	562	8	296	26	Bremer Bay ...	483	14	375	24
Brookton ...	478	10	...	...	Hopetoun ...	389	9	237	11
Wandering ...	437	13	441	20	Ravensthorpe ...	235	8	148	7
Pingelly ...	354	10	366	18	Esperance ...	345	14	413	25
Narrogin ...	402	9	327	17	Israelite Bay ...	103	13	195	24
Marradong ...	475	10	557	11	Balladonia ...	146	8	116	18
Williams ...	352	9	379	24	Eyre ...	107	12	177	24

*100 points lin

REMARKS ON THE RAINFALL FOR JUNE, 1909.

The aggregate totals for the month show that there was an excess of precipitation throughout the coastal portions of the West Kimberley, the whole of the North-West division and the greater portion of the Gascoyne and the Goldfields, as well as a large part of the South-West and portion of the South coastal areas. The remaining portion of the State, viz., the East Kimberley, inland West Kimberley, and West coastal areas between Carnarvon and Dongarra, including Geraldton, the extreme Eastern portion of the Coolgardie Goldfields, the greater part of the Eucla division, and a portion of the South-West lying between Albany and Karridale on the South and extending Northwards as far as Jarrabdale, taking in a majority of the South-West coastal stations, disclosed a deficiency, which ranges from four points at Carnarvon to 298 at Collie.

As will be noticed from the monthly totals the greatest excess is shown over the inland portions of the North-West division.

No rain fell in the East Kimberley or in inland West Kimberley division, but showery conditions predominated on the coastal portions of the West Kimberley and throughout the North-West division the first three days of the month, whilst on the 4th and 5th light to heavy rain was recorded in connection with a depression, which had developed on the North-West coast, over the same area. From the 6th to the 13th scattered showers were noted, but on the three following days further light to heavy falls were recorded throughout the North-West, being particularly heavy in inland portions as well as on the coast from Fortescue to Winning Pool. On the 17th the coastal districts

between Derby and La Grange received light to moderate falls, but since then, excepting a few isolated showers, dry conditions predominated.

The Gascoyne and Goldfields were visited with showers here and there during the first ten days, while on the 11th and 12th light to moderate rain was registered at the majority of stations, the Murchison Fields between Lenonville, Yalgoo, and Murgoo received the largest quantity. Only a few showers fell on the 13th, but the next four days saw almost general light to heavy falls; the North Murchison fields recording the heaviest downpour. From the 18th to the 24th showery conditions prevailed, but since then, excepting a few scattered showers on the last day of the month, no further rain was reported.

In the South-West and South, excepting Busselton, which registered 125 points on the 8th, only light showers fell during the first nine days, and these were chiefly confined to the extreme South-West and along the South coast, but rain commenced in the South-West coastal areas on the 10th and heavy general falls were recorded the following day, light scattered the next few days, and from the 15th to 22nd almost general rain fell throughout, the heaviest falls occurring on 15th and 21st. Between the latter date and the 28th, light isolated falls were reported from coastal stations, but on the 29th heavy falls were noted at Naturaliste and Busselton, the respective totals being 195 and 429 points, while on the last day of the month light to heavy showers were registered at the majority of stations in the South-West.

Weather Bureau, Perth, 30th June, 1909.

EDITORIAL REQUEST.

Correspondence and Queries are invited from subscribers and readers of the Journal on any subject of interest to agriculturists and other settlers on the land, either conveying useful information or seeking it. Suitable letters and contributions will be published and answers to queries given in the succeeding issue, if communications are received by the Editor not later than the fifteenth of each month.

Secretaries of Agricultural Associations, Societies, and Farmers' Clubs are kindly requested to supply corrections of the lists published in the Journal, such as changes of appointments, dates of shows and meetings, as well as any other items of interest.

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Harvey Citrus Society	Kenneth Gibson, Harvey
Harvey District Society of W.A.	L. S. Dean, c/o Messrs. Sandover and Co., Perth
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Mandurah Progress and Agricultural Association	C. Tuckey, Mandurah
Marbellup and District Settlers' Association	F. Mullineaux, Evergreen Valley Marbellup, G.S.R.
Margaret River Progress Association	L. E. de Mole, Margaret River.

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Moonyoonooka Farmers' Association	W. H. Williams, Moonyoonooka
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North Greenough Farmers' Association	W. F. Stansfield, Booterah
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Parkerville Agricultural Society	S. Ramsay, Parkerville
Plantagenet Beekeepers' Association	Vacant.
Popanyinning Progressive League	F. R. Bayliss, Popanyinning Pool, G.S. Railway
Preston Progress Association	T. B. Jones, Preston
Quindalup Progress Association	W. E. Carter, Busselton
Spearwood Progressive Association	R. Barton, Hamilton-road, Spear- wood, Fremantle
Talbot Progress Association	O. Ryan, York.
Thomson's Brook Progress Association	J. W. Pudman, Thomson's Brook.
Toodyay Vine and Fruitgrowers' Association	W. A. Demasson, Newcastle.
Tenterden Agricultural Society	J. Lunt, Tenterden
Upper Chapman Farmers' and Fruitgrowers' Association	D. O'C. Kehoe, Narra Tarra
Victoria Plains Farmers' Association	J. Halligan, Summer Hill, Victoria Plains
Waigerp Agricultural Hall Association	W. J. Eastcott, Waigerp
Wandering District Agricultural Society	W. B. Smithson, Wandering
Wanneroo Farmers' and Gardeners' Association	F. E. Hollins, Wanneroo
Waterloo Farmers' Vine and Fruitgrowers' Association	T. W. Harris, Waterloo
West Swan Producers' Association	J. H. Stone, Guildford
Wongamine Farmers' Club	G. W. B. Smith, Wongamine
Wonnerup Progress Association	P. S. Brockman, "Reinscourt," Busselton
Wooroloo Progress League	T. H. Ibery, Wooroloo
W.A. Beekeepers' Association	W. Potter, Goldsworthy Road, Claremont
Wagin Beekeepers, Poultry Fanciers, and Fruitgrowers' Association	F. A. Pfeiffer, Wagin.
West Albany Settlers' Association	Alfred Burvill, Gramsere, via Albany
West Coolup Progress Association	Stanley Caris, Pinjarra
West Pingelly Progress Association	J. J. Parker, Neta Vale, Pingelly.
Yorkrakine Progress Association	Walter R. E. Powell, Yorkrakine.

POULTRY AND DOG SOCIETIES.

SOCIETY.	SECRETARY.
Albany	J. F. Cuddihay, Albany
Boulder	W. R. Rossiter, Boulder
Bunbury	E. Krachler, Bunbury
Claremont	C. H. Evans, Claremont
Collie	A. E. Smith, Collie
Coolgardie	J. S. Stewart, Council Office, Coolgardie
Fremantle	A. J. Parkin, Queen Street, Fremantle
Gingin	Chas. W. Johnson, Gingin
Kalgoorlie	H. R. Bristow, Kalgoorlie
Subiaco Poultry, Pigeon, and Cage Birds' Society	E. Austin, Hensman Road.
West Australian	Jas. Bolt, Hay Street.
West Australian Canary, Pigeon, and Bantam Club	Harry Barnett, 159 Barrack Street, City.
West Australian Minorca Club	E. J. Ford, Rockton Road, Claremont.

DATES OF MEETING OF SOCIETIES.

- Albany and District Settlers' Association—
At Torbay Junction.
- Armada Progress Association—
Last Tuesday in each month, at 8 p.m.
- Boyanup Farmers' and Progress Association—
First Saturday in each month.
- Brunswick Farmers' Association—
Wednesday preceding full moon, at 8 p.m., at the Agricultural Hall.
- Capel Farmers' Association—
Last Saturday on or before the full moon, at 8 o'clock.
- Greenough Farmers' Club—
January, April, July (annual), and October.
- Jarrahdale and Serpentine Agricultural Society—
Meet the Saturday preceding the full moon, at 8 o'clock p.m., at the Agricultural Hall,
Mundijong.
- ROYAL AGRICULTURAL SOCIETY OF W.A.—
Second Tuesday in each month.
- Upper Chapman Farmers' and Fruitgrowers' Association—
Last Saturday in the months of December, February, April, July, August.
- W.A. Beekeepers' Association—
Second Wednesday in each month, Museum, Department of Agriculture, 7.30 p.m.
- Wanneroo Farmers' and Gardeners' Association—
Saturday on or before full moon, at Wanneroo State School.
- West Coolup Farmers' Association—
Second Saturday in each month, at 3 p.m., at Mr. Barry's residence.



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Before buying elsewhere write for Illustrated Catalogue.

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AGRICULTURAL BANK.

ADVANCES TO FARMERS.

Advances are made under Section 28 of "The Agricultural Bank Act, 1906," for:—

- (a.) Ringbarking, clearing, fencing, draining, or water conservation.
- (b.) Discharging any mortgage already existing on holding; or
- (c.) The purchase of stock for breeding purposes,

ON THE SECURITY OF:—

- (a.) Holdings in fee simple; or
- (b.) Holdings under Special Occupation Lease or Conditional Purchase from the Crown; or
- (c.) Homestead Farms; or
- (d.) Such other real or leasehold property as the Trustees may think fit.

Advances may be made of an amount not exceeding £300 to the full value of the improvements proposed to be made.

Further advances may be made of an amount not exceeding £200 to one-half the value of the additional improvements proposed to be made.

No advance shall be made to discharge an existing mortgage to an amount exceeding three-fourths of the value of the improvements already made on the holding. The improvements recognised for this purpose are :—Ringbarking, clearing, fencing, draining, and water conservation. Advances are not made for "completion of purchase"; liabilities which have been incurred in the development of the security only being recognised.

At no time shall the advances to any one person (or number of persons if borrowing conjointly) exceed the sum of £500, and no sum exceeding £100 shall be advanced to any one person for the purchase of breeding stock. In applications for this purpose, the condition and capability of the security to successfully carry stock is of paramount importance.

Persons under 21 years of age, being unable to legally mortgage, are debarred from borrowing from the Bank.

Every application for an advance must be made on the Bank's forms, and shall contain all particulars required thereon.

Applications may be for sums of £25 or any multiple thereof, not exceeding £500. Each application must be accompanied by a valuation fee of 1 per cent. of the amount applied for. No refund of fee is allowed after an inspection of the security has been made.

Mortgages are prepared free of charge, but borrowers are required to pay the statutory charges in connection with their registration. These are:—

- (a.) Stamp Duty of 2s. 6d. for each £50 of the amount of mortgage up to £300; and
- (b.) A registration fee of 5s. for each Conditional Purchase or Homestead Farm Block mortgaged.

The Leases or Occupation Certificate, as the case may be, together with the above fees, must be in the possession of the Bank before a mortgage can be prepared.

NOTICES OF APPROVAL are insufficient for this purpose.

Intending borrowers are requested to note that no advances except for the specific purposes of discharging liabilities, or for purchasing breeding stock, are made against improvements effected prior to date of application. Applications should, in every instance, be lodged prior to commencement of work, and moneys are then paid over in progress payments as the work proceeds.

Repayments of loans extend over a period of 30 years, except in the case of stock advances, which have a currency of seven years only. Interest is charged at the rate of 5 per cent. per annum, payable half-yearly.

To the Man on the Land



Are your Wife & Children fully provided for in case of your Death?

What would be their position with that advance from the Agricultural Bank undischarged?

Effect a Life Policy with the

AUSTRALIAN MUTUAL PROVIDENT SOCIETY

Follow the example of Hon. Jas. Mitchell, Minister for Agriculture, the holder of Policy No. 130373.

ACTUAL RESULTS:

Policies effected in December, 1885, under Table	£	s.	d.
A for...	300	0	0
Bonus additions to 31st December, 1908	193	14	0
Full sum assured to date	493	14	0

And Bonuses will continue to be added each year.

Annual Premium, £5 15s. Total Premiums paid to 31st December, 1908, £138.

In case of death, the Society would Return as Bonuses the Total Premiums Paid, with a further sum of £55 14s. added. The full sum assured, £300, would also be paid to the members representatives.

DELAY IS DANGEROUS. ASSURE AT ONCE

DIRECTORS IN WESTERN AUSTRALIA:—Hon. G. Randall, M.L.C., Chairman; James Morrison, Esq., J.P., Deputy Chairman; John F. Stone, Esq., J.P.; Charles Hudson, Esq.

GAVIN LUCAS, Resident Secretary.

OFFICE: ST. GEORGE'S TERRACE, PERTH.

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WESTERN AUSTRALIA.**Prominent Liberal Provisions in Land Laws**

—AND—

CONCESSIONS TO SETTLERS.

1. A Homestead Farm of 160 acres. Application fee, £1; survey fee, £3; stamp, 1s. Conditions: Personal residence for six months in each of the first five years after survey, or residence on C.P. lands within 20 miles. Boundaries: Half to be fenced within five years; the whole within seven years. Improvements: 4s. per acre must be expended in the first two years, 6s. per acre during next three years, 4s. per acre during last two years, making total of 14s. per acre in seven years.

2. Conditional Purchase Lands.—From 100 acres to 1,000 acres at from 10s. per acre, payable in 40 half-yearly instalments at the rate of 3d. per acre. Conditions: Personal residence for 5 years, one-tenth of boundaries to be fenced within two years, the whole within 5 years, and improvements to the full value of purchase money to be made within 10 years. Half the value of boundary fence may be allowed in estimating value of improvements. Conditional Purchase Lands may also be selected without the condition of residence, in which case the improvements in value must equal one and half the amount of the purchase money, but not exceeding £1 10s. per acre.

3. Land for Orchards, Vineyards, or Gardens, from 5 to 50 acres, from 20s. per acre, payable in three years. Improvements, including fence, to be completed in three years.

4. Full particulars as to conditions, areas, and further methods of obtaining land will be found in the pamphlet "Selector's Guide," obtainable on application to the undersigned.

5. Surveys are carried out by the State at half cost to selectors.

6. The Agricultural Bank renders monetary assistance to enable settlers to effect improvements when land has been substantially fenced.

7. On a selector proceeding to any district for the purpose of selecting land, the nearest Land Agent will supply all information, plans, and pamphlets, as well as a guide to conduct him to available land free of charge. In the event of an application for land being made, with the necessary deposit, a refund of railway fare may be obtained, if the deposit on land selected is equal to 50 per cent. more than the amount of the fare, and provided the application for refund is supported by a certificate from a Government Land Agent stating the place from which the selector proceeded for the purpose of selecting.

8. The Railway Department grants a special concession in the way of fares and freights for a new selector's family and goods, on production of a certificate of *bona fides* from the Lands Department. Any selector of an area of not less than 500 acres first-class land may obtain from the Lands Department an order for railway tickets and freight for his family, goods, and chattels, from the station nearest his present or late residence to the station nearest the land selected, the amount to be repaid to the Department by the selector by bills at 12 and 24 months, with 5 per cent. interest added; until the bills are paid the land cannot be transferred or mortgaged except to the Agricultural Bank.

9. Any new selector residing on his land can arrange passages for his wife and family to this State through the Colonial Secretary's Department.

10. Agencies are established at Menzies, Coolgardie, Kalgoorlie, Southern Cross, Cue, Northampton, Geraldton, York, Northam, Beverley, Newcastle, Bunbury, Katanning, Albany, Bridgetown, Busselton, Narrogin, Wagin, Pingelly.

R. CECIL CLIFTON,
Under Secretary for Lands.
Perth, Western Australia.

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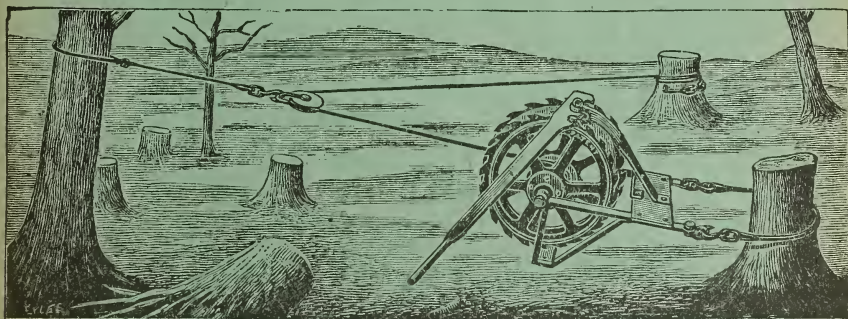
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Sheep Ear Pliers or Markers, all descriptions supplied to order.

Lambs' Tail-searing Irons, 3s. 6d. each.

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Sheep Shears, Burgon & Ball's and Trade Union brands, 3s. 6d.

Sheep Bells, Sheep Crooks, Sheep, Wool, and Fire Brands.

Red and Blue Ruddle for Sheep-marking.

Cattle Ear Pliers, Bull Rings, Bull Leads,

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Squatters' Knives—just the knife for Settlers—price 5s. each (Lockwood's make).

Rabbiters' Knife, Sheath, and Steel, 3s. 6d. per set. Rabbit Traps with Chains, 8s. per doz.

Butchers' Knives, Siding or Skinning, Sticking, etc. John Wilson's celebrated make.

Whale-oil Soap, for Spraying Trees, in 2lb. tins, 2s. each.

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Sulphur, 2d. lb., or in 1 and 2 cwt. casks.

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ENCOURAGE LOCAL INDUSTRY.

Immense Stocks of faultlessly trained, vigorous, clean Apple, Pear, Peach, Nectarine, Apricot, Prune, Plum, Jap. Plum, Cherry, Almond, Fig, Quince, Pomegranite, Filbert Trees, etc., at from 10s. to 15s. per doz., 70s. to 90s. per 100, according to varieties and size.

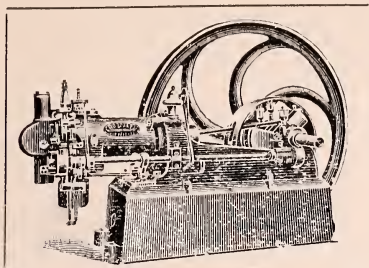
Mulberries, Persimmons, Olives, Walnuts, Chestnuts, Guavas, Passion Fruit, etc., Gooseberry, Currant (black, red, and white), Raspberry, Logan berry, and Strawberry Plants, Rhubarb Roots, etc.

ROSES in over 600 sorts, strong plants, my selection, 6 good distinct varieties, 5s.; 12 varieties 8s. to 15s. and 20s. Choice, hardy, Ornamental Trees, Shrubs, Plants, etc.

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PAYMENT SYSTEM.**

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Journal of the Department of Agriculture



WESTERN AUSTRALIA

SEPT.

1909.

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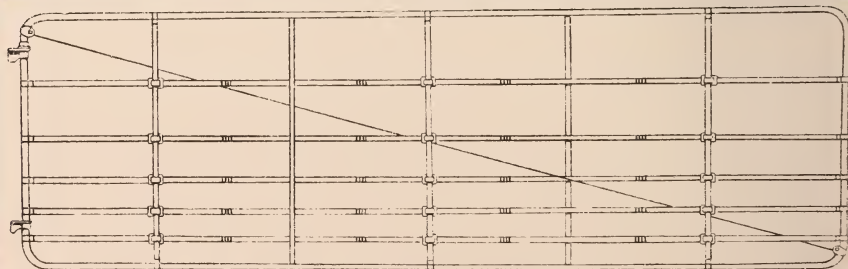
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This Gate is as light on the hanging as a Wire Gate with
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Price of 10ft. Gate from 27s. 6d. each.

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Fencing Wire, black and galvanised.

Wire Netting, Barb Wire, Galvanised Iron.

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Northam—2nd Tuesday in each month.

Beverley—3rd Tuesday in each month.

Northam—4th Tuesday in each month.

Midland Junction—Alternate Thursdays.

Competent Salesmen.

Cash Settlements.

Sales for the six months ending June 30 have been over 69,000 sheep, 720 Cattle and Horses, and 4,500 pigs. These markets are attended regularly by metropolitan and goldfields buyers.

Special sales conducted by arrangement.

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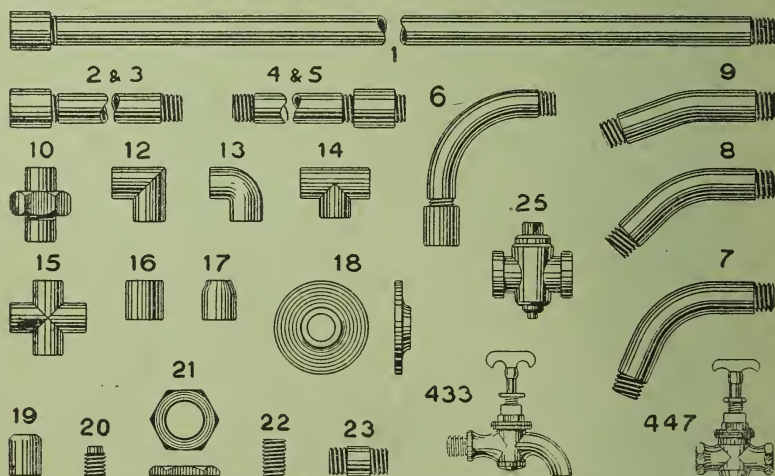
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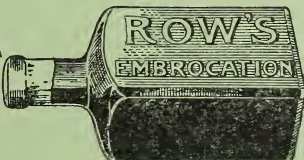
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ROW'S EMBROCATION for the last
30 years and have found it one of
the most useful remedies for horses.

If this is any use in securing
sales you are welcome to it.

Yours sincerely,

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None but skilled and experienced workmen ever find employment in our cutting room. Cutting from measurements taken by the customer is necessarily more difficult and particular work than if we had measured you ourselves, but long experience has made our work wonderfully accurate.

We guarantee Fit, Materials, Style and Workmanship.

Our Prices are absolutely Lowest for Reliable, Satisfactory Tailoring.

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To POULTRY KEEPERS.

The Department of Agriculture has for sale eggs for setting from:—

WHITE AND BROWN LEGHORNS,
BLACK ORPINGTONS,
GOLD AND SILVER WYANDOTTES,
MINORCAS,
PLYMOUTH ROCKS,
BRITISH GAME,
BUFF ORPINGTONS.

Also Ducks:—

INDIAN RUNNER,
PEKIN,
AYLESBURY,
ROUEN,
WHITE INDIAN RUNNER.

Prices from 10s. 6d. to 21s. per dozen.

For detailed Price List apply to

The MANAGER,

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Inspection invited Wednesday and Saturday afternoons.

To the Man on the Land



Are your Wife & Children fully provided for in case of your Death?

What would be their position with that advance from the Agricultural Bank undischarged?

Effect a Life Policy with the

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Follow the example of Hon. Jas. Mitchell, Minister for Agriculture, the holder of Policy No. 130373.

ACTUAL RESULTS:

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And Bonuses will continue to be added each year.

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DELAY IS DANGEROUS. ASSURE AT ONCE.

DIRECTORS IN WESTERN AUSTRALIA:—Hon G. Randell, M.L.C., Chairman; James Morrison, Esq., J.P., Deputy Chairman; John F. Stone, Esq., J.P.; Charles Hudson, Esq.

GAVIN LUCAS, Resident Secretary.

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PERTH.

AGRICULTURAL BANK.

LOANS to FARMERS.

UNDER THE AGRICULTURAL BANK ACT, 1906

(which repeals all prior Acts),

Advances, not exceeding in the aggregate £500, are made to Farmers and Cultivators for the following purposes:—

- (a.) Purchase of Breeding Stock.
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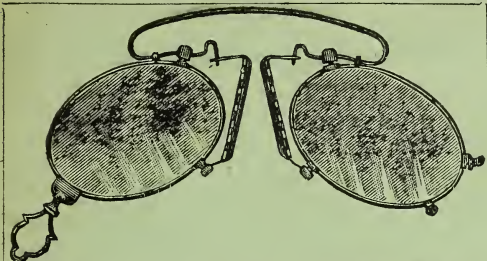
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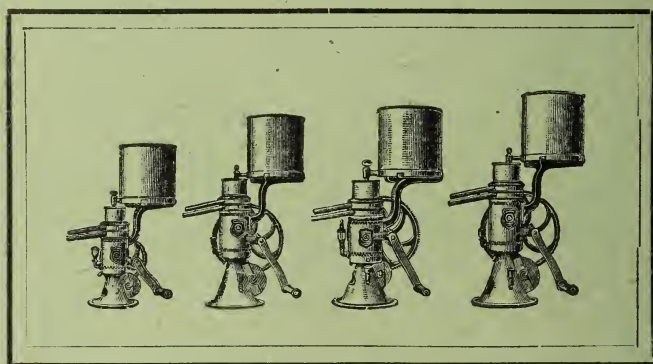
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Books for the Farmer.

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5 University Exhibitions of £450 each...	2,250	0	0
1 University Exhibition of £225 ...	225	0	0
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3. Land for Orchards, Vineyards, or Gardens, from 5 to 50 acres, from 20s. per acre, payable in three years. Improvements, including fence, to be completed in three years.

4. Full particulars as to conditions, areas, and further methods of obtaining land will be found in the pamphlet "Selector's Guide," obtainable on application to the undersigned.

5. Surveys are carried out by the State at half cost to selectors.

6. The Agricultural Bank renders monetary assistance to enable settlers to effect improvements when land has been substantially fenced.

7. On a selector proceeding to any district for the purpose of selecting land, the nearest Land Agent will supply all information, plans, and pamphlets, as well as a guide to conduct him to available land free of charge. In the event of an application for land being made, with the necessary deposit, a refund of railway fare may be obtained, if the deposit on land selected is equal to 50 per cent. more than the amount of the fare, and provided the application for refund is supported by a certificate from a Government Land Agent stating the place from which the selector proceeded for the purpose of selecting.

8. The Railway Department grants a special concession in the way of fares and freights for a new selector's family and goods, on production of a certificate of *bona fides* from the Lands Department. Any selector of an area of not less than 500 acres first-class land may obtain from the Lands Department an order for railway tickets and freight for his family, goods, and chattels, from the station nearest his present or late residence to the station nearest the land selected, the amount to be repaid to the Department by the selector by bills at 12 and 24 months, with 5 per cent. interest added; until the bills are paid the land cannot be transferred or mortgaged except to the Agricultural Bank.

9. Any new selector residing on his land can arrange passages for his wife and family to this State through the Colonial Secretary's Department.

10. Agencies are established at Menzies, Coolgardie, Kalgoorlie, Southern Cross, Cue, Northampton, Geraldton, York, Northam, Beverley, Newcastle, Bunbury, Katanning, Albany, Bridgetown, Busselton, Narrogin, Wagin, Pingelly.

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JOURNAL

OF THE

DEPARTMENT OF AGRICULTURE

OF

WESTERN AUSTRALIA.

By Direction of

The HON. THE MINISTER OF AGRICULTURE.

PUBLISHED MONTHLY.

Vol. XVIII.—Part 9.

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*SEPTEMBER, 1909.*  
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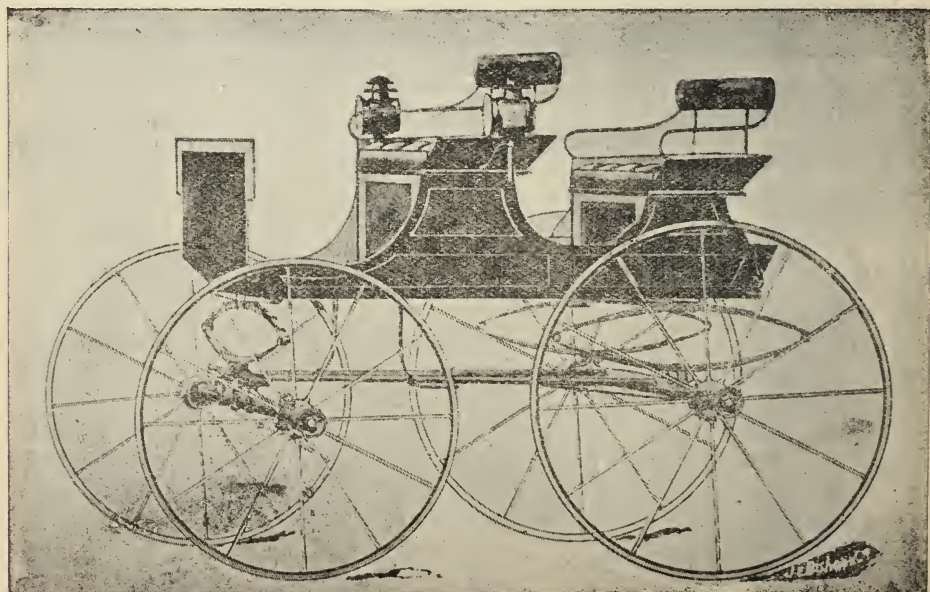
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OF THE
Department of Agriculture
OF
WESTERN AUSTRALIA.

Vol. XVIII.

SEPTEMBER, 1909.

Part 9.

NOTES.

— — — — —

Nitrate of lime.—As a fertiliser nitrate of lime has been used with great success in experimental trials in England and Scotland.

— — — — —

The Boar's useful age.—The age at which the boar should be used depends to some extent on the breed, on its tendency to mature early, and the influence of feeding. From eight to ten months is the usual age.

— — — — —

Argentine Export Trade.—During the year 1908 Argentine exported 180,814 tons of frozen beef valued at £3,616,000; 78,846 tons frozen mutton, value £1,526,000, and wheat, 3,636,294 tons valued at £25,768,000.

— — — — —

Value of Australasian Wool.—The average value per bale of all the wool sold in Australasia during the past twelve months was £11 6s. 10d., as compared with £13 0s. 2d. for the previous year—a decrease of £1 13s. 4d., or 12.8 per cent.

— — — — —

Lucerne for Swine.—In the lucerne regions of America brood sows are fed exclusively on lucerne hay in winter and pasture in summer time. Very little grain, or none whatever, is fed. As a result the sows are always strong, vigorous, and healthy.

— — — — —

Export of Dutch Cattle.—The Consul-General for the Netherlands in Melbourne has forwarded to the Department copy of a publication issued by the Netherlands Department of Agriculture dealing with the testing of breeding cattle destined for export. By Royal Decree dated September 11, 1908, the Netherlands Government give facilities to test cattle intended for export and to obtain an official certificate that the animals are sound and otherwise fit for export.

Care of the Horse.—When the frog of the horse's foot is kept from contact with the ground, especially if it has been mutilated with a knife, it will dry up and shrivel away, the heels will become narrow and a general contraction of the hoof will ensue.

Sheep manure.—Sheep manure is generally richer and drier than that from any other domestic animal except poultry. It ferments easily, and is classed as a quick-acting manure; but when allowed to accumulate in pens, where it is trampled hard by the animals, it loses some of its value.

Potato Disease.—Though in the great majority of reports (says *Agricultural Gazette*, Eng.) on the crops potatoes are said to be healthy, disease, however, has appeared extensively in the South-West of England, and to some extent in the East. In Ireland the Agricultural Department reported the appearance of disease in several counties, but chiefly in small gardens.

Milk fever in Cows.—Unless cows are healthy and vigorous they cannot prove profitable, but will prove a loss, generally. The following is suggested by an experienced New Zealand dairyman as a preventive of milk fever:—Half a packet of Syke's Drench given once a fortnight and another half packet one week before calving. Prior to using this remedy he had lost a number of valuable cows from milk fever, but since adopting this treatment some years ago he had not lost one.

Weight and Value of Fleeces.—By dividing the total number of sheep depasturing in the Commonwealth and New Zealand, viz., 109,345,967 into the net weight of wool produced, including that used for local manufacture, viz., 756,019,217lbs., it will be seen that the average weight of wool produced per head works out at 6lb. 14ozs., which compared with 6lb. 9ozs. in 1907-8. The average monetary return has been 4s. 9d. per head of sheep and lambs, as against 5s. 1d. for the previous season, the lesser monetary return being attributable to lower values ruling for wool.

Australasian Exportable Production.—The total exportable wool production of Australasia has amounted to 2,288,104 bales, which, if taken at the average of £11 6s. 10d. per bale, shows the value to be £25,950,912; but to the above must be added 40,273 bales which have been manufactured into cloth, etc. in the Commonwealth and Dominion, worth £456,763. Thus the total gain in wealth from wool during the year 1908-9 has been £26,407,675, and this is only assuming that the wool exported direct to London for sale shows the same net return per bale as has been obtained in colonial centres.—(*Dalgety's Review*.)

New South Wales Wheat Crop.—The Government Statistician of New South Wales estimates the area under wheat in that State for the present season as 2,240,408 acres—an increase of 251,000 acres, or 12.16 per cent., as compared with last year. Owing to the very serviceable rainfall the area expected to be reserved for grain is estimated at 1,871,310 acres—an advance of 477,254 acres, or 34.2 per cent. The crops generally, it is reported, are in a very forward and healthy condition, and there is every indication of a splendid harvest. The report states that while it is too early to hazard an estimate



SHEEP IN WESTERN AUSTRALIA.
The last batch to be shorn.



of the probable yield, farmers appear to be unanimous in declaring that never before in their experience of wheat culture have the prospects of an abundant harvest been so encouraging.

Strawberry Clover.—Strawberry clover is a fodder plant the chief virtue of which appears to be that it will grow on swampy soil and yield a nutritious food for stock. While in Gippsland (says the *Agricultural Gazette*) Inspector Ross took the opportunity to inquire if plants of strawberry clover could be obtained. The results which have been obtained from this plant are said to be really wonderful. Badly drained sour patches, overgrown with rank, coarse grass, have been planted with strawberry clover roots about 2ft. apart. The first year's growth has the effect of killing this rank growth and leaving a green carpet of clover. At Orbost, Messrs. Nixon Bros. are fattening 500 bullocks on 320 acres of strawberry clover. The method of planting is simple. A sod of roots is chopped up with a spade in pieces about 1in. to 1½ long. The pieces are then broadcasted, and a heavy roller run over the land.

AUSTRALIAN SALT BUSH IN SOUTH AFRICA.

The *Farmers' Advocate*, Orange Colony, gives the following account of the progress made with cultivation of the saltbush in South Africa:—

"Australian saltbush has proved its value as a forage plant in trials made at Grootvlei during the past four years. It is a splendid drought resister when once established, and it is available as feed for cattle and sheep either in times of severe drought or in the winter, when the veld is brown and bare. Saltbush is particularly valuable for planting on shallow brak soils where many other crops will not grow, and owing to its drought resisting qualities it is well suited to the Western portions of the Colony. One variety, 'Old Man,' stands out ahead of all others as the most suitable saltbush for cultivation under our conditions. It grows to a height of six feet, with branching woody stems, but bearing an abundance of shoots which are much relished by stock. Saltbush seed has been distributed throughout the Colony with varying results.

"A number have succeeded in establishing it while the majority have reported failures. In the latter case the difficulty appears to have been largely due to wrong or doubtful methods of planting. To ensure success the seed should be sown in tins, and when the plants are well up they should be transplanted into other tins or nursery beds, and finally set out in the ground when they are strong and in a flourishing condition. January or February, as rain permits, is the most favourable time for planting out. The ground should be well prepared previously by ploughing and harrowing. It is necessary to keep stock off the plantation for the first year."

MIXED FARMING.

HOW TO SET ABOUT IT.

ADDRESS BY THE DIRECTOR.

The Director of Agriculture, at the invitation of the local Progress Committee, paid a visit to Armadale and district in the early part of the month and delivered an address on "Mixed Farming." Mr. H. Carter presided over a large attendance of farmers and their wives in the public hall.

After a brief introduction by the chairman Professor Lowrie thanked the Progress Committee for the opportunity they had afforded him of looking through the district. He noticed that their industries in the neighbourhood were many and varied, and he believed that the district had a fine future. While, however, the varied utilisation of the lands argued well for the capacity of the district, he thought perhaps that the industry for which it was most of all suited was that which he would call "mixed farming." The best results and highest revenue could be obtained by making dairy farming one of the principal items of their practice, and they would then be able to work in the other adjuncts, which would enable them to get the fullest possible returns from their land. Situated as they were, with a heavy rainfall (some 34in.), and with, so far as he could gather, a certain amount of underground soakage, with water at no great depth and in a market in close proximity, he thought they had every chance of working up a most profitable industry.

Co-operation.

As an addition to their natural advantages he would strongly advise them to organise a thoroughly good co-operative society amongst themselves, not necessarily for the manufacture of produce, but for mutual help in marketing it. Whilst that industry was engaged in by relatively only a few farmers, they were too much at the mercy of the middlemen, but by getting a large number of farmers together, and putting more regular supplies on the market, they would be able to command much better prices than if they worked as isolated units. He thought that in Western Australia co-operation was one of the most desirable things for the farmers—not that co-operation that was formed by bringing capitalists into it, but co-operation where all the shares and all the interests were held by the producers of the products which were being dealt in. It seemed to him that such a system would be necessary before those lands of the south-western districts would return the full value of which they were capable.

Dairying.

After pointing out the variations which had taken place in years past in the prices of such commodities as wool, wheat, and so on, the Director showed how constant had been the market value of butter, and how, if the world's output had increased of late years, so had the world's absorption of that ar-

tiele. To make the most of dairying in Western Australia, continued the lecturer, there was no question whatever that that must be done through the growing of fodder crops. Our country did not carry in its natural state what might be called rich pastures, and this was accounted for by the presence of a vigorous scrub which had pretty well cleaned out the finer vegetation such as grasses. The practice had been going on for years, moreover, of burning off the bush and gradually clearing the country of the best seeds, leaving behind only the hardest. After comparing the carrying capacity of our lands with that of New Zealand lands, the lecturer said that taking all things into consideration there was a good proposition here, seeing that we had so far to go before we could overtake the local markets. For the reasons that he had stated our dairying here must be done by the help of fodder crops. After farmers had raised the fertility of the soil by growing well-manured crops of that kind and sweetening it by cultivation they could then let it lie out under its natural herbage for a few years, which herbage they would find had wonderfully increased in density and fattening qualities. In his opinion, no matter how good land was, if a man wished to take up dairying and make a success of it he must go in for forage crops. A good farmer had to make provision for keeping his cows through the bad times of the year, and that was the only paying way to do it. It could not be too strongly or too frequently urged upon those men who were milking cows that the most important consideration was to feed them well. In order to emphasise that remark he would remind them that a cow would produce in a year nearly her body weight of solid matter, namely, butter, sugar, cheese, and so on. She had to draw from her food her ordinary bodily sustenance, she had to supply the energy necessary to change the chemical constituents in the food into milk and butter fat, and it would, therefore, be seen that good food was indispensable to her. Too often men looked upon a cow's udder as a kind of widow's cruse, in which magic would replace whatever they might draw from it. There was no magic about a cow, only a constant effort to draw from her food as much of that wonderful product, milk, as she could. If a man would make a success of his cattle he must give them every chance, and not turn them out to forage for themselves in the ordinary bush country. (Applause.) They would always find that a cow responded to good treatment, and that with the right class of food the yield of butter fat and the quantity of milk would be increased, and the lactation period be extended. Further, if animals were kept well there was less danger of tuberculosis. By allowing animals to get low in condition owners were exposing themselves in a greater degree to the risk of disease and the loss of their herds.

Crops and Fodder.

It was encouraging and gratifying on going round the district that day to see the excellent crops of field peas which were growing in some of the farms. He had also seen good crops of oats and wheat, and thought there seemed to be a possibility of heavy crops resulting. If he (the speaker) had his way he would have every farmer who took up dairying make the whole practice of his farming work round the dairy cow, and would have him as far as possible grow all his own feed. It would be unwise of the small farmer to think of competing in the matter of chaff with the man who possessed large areas of agricultural country. He was sure the farmer could make better use of his chaff by feeding it back on to the land through his cattle, and market-

ing it in the form of dairy produce. A mixture that he thought he would thoroughly recommend as a fodder crop was that of oats, barley, and pease. The seed might be drilled two ways on well-manured ground, and it would be found, if it were not consumed as green stuff, that it would make a fine chaff which the stock would eat with relish. What a cow needed was plenty of albumenoids. It was to supply that element among others that bran and linseed and other cakes were generally added to the feed. By growing legumes, vetches or peas, etc., that very necessary element could be readily and cheaply obtained. He would therefore, strongly urge upon the farmer to mix a good, hardy field pea with his oats or barley, or better still to mix them with vetches if they could get hold of the right kind. He had been much struck in travelling over the South-West by the fact that most of the farmers seemed to get up too late in the matter of seed planting. Many of them were planting seed when the land was dead and cold, when there was no activity in it, either physical or biological, and when it was often water-logged and soar. If a man would have winter crops he must adopt the earlier sowing. He was quite prepared to believe that in some circumstances the growth would be so vigorous that there would be some danger of the crop going down, but that could generally be avoided by their choosing a seed which was adapted to the conditions under which they were working. The forage crops that he had mentioned must be sown early. If they could be got ready for the first rains they would well reward the farmer. Italian rye grass was also a wonderful feed, and he was inclined to think would do well in those districts. He had noticed that wherever it was growing down the line it gave promise of great things. A thick sward of such grass was capable of carrying a relatively larger number of stock, and though the seed was somewhat dear it should well repay the farmer who used it. Of summer crops he would suggest maize, sorghum, millets, cow peas, pumpkins, but of all would urge that most attention should be devoted to maize-growing. Maize was capable of giving marvellous returns, often of as much as 14 tons or more to the acre.

Manure System.

The best crops were grown with the aid of farmyard manure, which should be worked well into the land before planting. If the farmer desired to add some nitrogenous element he could use nitrate of soda, sulphate of ammonia, or dry blood. The more land was worked the better were the results obtained. It was essential that light and air should be freely admitted to the soil in order that the bacteria which were working for the farmer might have every chance of doing their duty. There was some danger of using such manures as bone dust unless the farmer knew well where they had come from, as such a disease as anthrax was frequently brought into a district through their agency. Land, too, should be well drained. It was a mistake to think that because there was a substratum of water just below the surface crops would grow better. As a matter of fact such water really stunted their growth, for they became shallow-rooted and unable to withstand the dry weather in the same way as deep-rooted plants. He would urge every farmer to keep up the phosphates on his land, to make it, in fact, the very basis of his practice. It was, moreover, generally cheaper in the long run than the less expensive manures. He would also endeavour to make up the nitrogen that might be wanting in the phosphates by adding small quantities of sulphate of ammonia. It

was, of course, a dear chemical, and he would suggest that a number of farmers should club together and get some merchant to indent them a good supply on commission. They could thus procure it cheaper per ton. The use of phosphates would also induce the growth of excellent natural fodders, such as trefoil, dandelion, geranium, and so forth. There was much less necessity for the use of potash, for the soil in their district was granitic and contained a good deal of natural potash in the shape of silicates. If they felt that any of their land was deficient in that respect they could easily add to the phosphates a small percentage of sulphate of potash.

At the conclusion of his address, which was listened to with marked attention, Professor Lowrie was asked a number of questions concerning difficulties which had long been exercising the minds of the farmers, and he was accorded a hearty vote of thanks.

REPORT ON PERMANENT PASTURE GRASSES.

ROYAL AGRICULTURAL SOCIETY'S COMPETITION.

Mr. A. Despeissis, Under Secretary of the Agricultural Department, has made the following report upon the 1909 competition on growing permanent pasture grasses organised by the Royal Agricultural Society of W.A.:—

“Little response has been given to the efforts of your Society to encourage the laying down of permanent pastures by means of special competitive prizes. Great interest, however, is shown in the matter, and keener competition for the next two years is almost assured. The prizes in previous seasons were open to the whole farming portion of the State. In order to more evenly equalise the chances of competitors in districts far apart, and where the circumstances of soil and climate differ widely, your Society has since offered two sets of prizes, viz., one for the Southern districts, South of an East and West line running through the township of Pingelly, and one for the Northern districts, situated North of that imaginary line. Four entries only were registered, two in each of the districts named. Towards the end of the summer, when inspection of the fields was contemplated, two of the competitors withdrew, the pastures having failed to stand the rigours of the summer. These two entries were both in the inland farming districts, viz., at Kellerberrin and Katanning. The result of the experience of a number of farmers in these drier inland districts tends to show that the sowing of grass in the autumn with a pulse crop has, so far as the Eastern districts are concerned, been unsuccessful. The hope that a crop of cereals would pay for the ploughing even if the grass failed has not been realised in the dry inland districts. In the cooler and moister conditions of the South coast, and notably at Mt. Barker, I have seen both cocksfoot and ryegrass, sown with a clover crop, show a fair stand. For that purpose, half the usual amount of grain to the acre is

sown of some early variety of cereal, wheat, barley, or oats, in the order named. Varieties with short, stout straw, are not likely to lodge preferably.

Except under exceptional circumstances, where almost any results may be obtained (which cannot be expected when the experiment is repeated over the wide areas which represents the bulk of the farming land around), the favourite English grasses, cocksfoot and ryegrass, and also lucerne, red clover, melilot, couch grass, and paspalum, cannot be relied upon for supplying green summer pastures over the greater portions of the wheat belt, served by the Great Southern railway, the Eastern railway, and their subsidiary spur lines. In the districts named attention must be directed to other grasses if green summer pastures are the objectives. Such fodder crops that retain their nutritive properties, although dry, are better adapted to the conditions prevailing in those districts, where the air remains dry throughout the summer months. Most leguminous plants, such as peas, vetches, clover, trefoils, and also (as demonstrated at Hazely by Mr. Vernon Hamersley), rye grass, among the true grasses, will provide nutritious fodder, if not green feed, during the summer months.

NORTHERN DISTRICT.

Mr. Vernon Hamersley has with some success investigated at Hazeley what grasses offer the best prospect of supplying a crop of green fodder during the summer months. The property is situated about 14 miles North-East of Newcastle, along the Bolgart railway, and 20 miles North of Northam. It stands in the centre of an extensive and important farming district, which comprises Toodyay, Bolgart, Victoria Plains, Goomalling, and Northam. The rainfall averages 17 inches, and the land consists of a brown loam, ranging from light to heavy, which overlays red clay. Granite outcrops show in places. The timber varies with the land, and consists of jamwood, and, in moist places, blue or flooded gum. That class of country is typical of the Eastern districts referred to. It lies between jarrah and the fluted gum forests. These forests and red gum land of the Darling Range on the West, and on the East the salmon have, of late years, been in great demand for farming when within a reasonable distance of a railway, and also with a safe average annual rainfall of 11 inches. After the land has been cleared and brought under cultivation, moist patches occur in places. A number of these become salt, and until they are drained, and the excess of salt is enabled to leach out, they remain barren.

Mr. Hamersley has tried, with varied success, a number of fodder crops, including lucerne, with which he seeded 100 acres of wheat crops. Salt bush, of which the creeping kind (*Antriplex semibaccata*) shows here and there, and deserves a fresh trial; paspalum, which, while doing fairly well in places, has proved a failure in others; and Johnson grass, of which he has about five acres. Two entries were left for inspection, one for the Johnson grass, and the other for the paspalum. In order to better test the value of suitable kinds of green summer fodder plants for permanent summer pasture, the Royal Agricultural Society placed no restrictions as to varieties. Each competitor was given carte blanche in the matter of selection. Mr. Vernon Hamersley entered into the spirit of the competition with an evident desire to test in a practical manner the value of a number of grasses and fodder plants likely to meet the requirements of stock owners

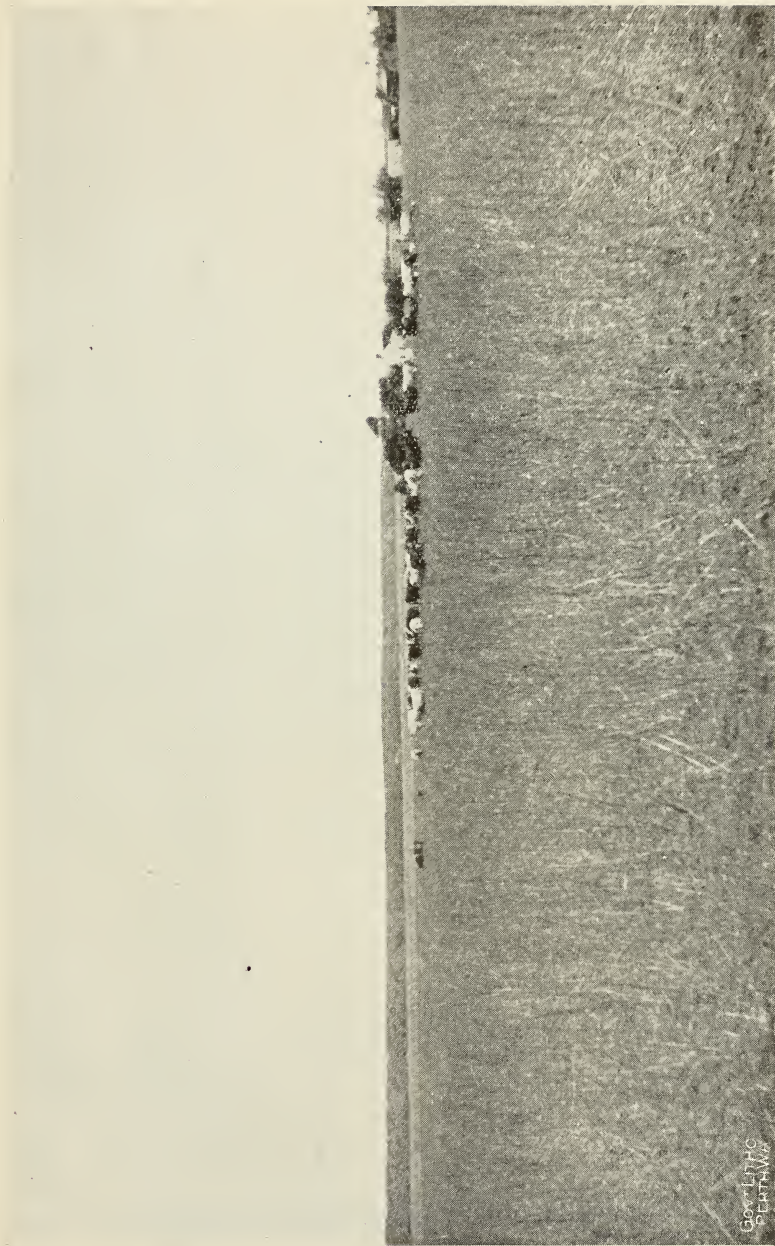
in the Eastern districts of the South-Western Division. I was thus given an opportunity of seeing the result of extensive sowing of lucerne on 100 acres of corn land, of salt bush on 20 acres of moist land, where salt patches are coming more and more pronounced after clearing and cropping; Italian rye grass over 150 acres of bush land was the most successful experiment as regards a stock feed production, although the grass is too dry towards the end of summer to come within the conditions laid down for the competition. *Paspalum dilatatum*, or Golden Corn grass, three acres, was a partial success, and Johnson grass (*Sorghum halapense*), three and a half acres, best answered the conditions of the competition. Johnson grass has been much decried by some people on account of the persistency with which it will come up again, when once established in a field. Tillage operations do not destroy it, but whenever it is desired to eradicate the plant, they will, on the contrary, by breaking the fleshy runners underground, more widely distribute it in the loosened ground, and cause it to grow thicker than ever. On this account, this grass is rightly looked upon as a curse in an orchard or vineyard. Its luxuriant growth drains the soil of the moisture required by trees and vines, and necessitates the expenditure of much labour and time in repeated cultivations. On a stock run, on the other hand, this drawback becomes a virtue. For rocky ground, sand plains, and even on wheat fields in the drier settled districts, I believe Johnson grass will be one of the best for supplying during the dry summer months when most other grasses brown off, an abundance of nutritious and succulent fodder. The seeds germinate readily, and each fragment of the underground running roots will strike without fail. All kinds of stock, pigs included, like it. Its nourishing value stands high. It offers a bulky and succulent amount of nourishment at a time when the diet of stock is restricted to dry feed. When all these qualities have been enumerated, it is right to again warn the growers against its invading habits of growth. Further, under particular conditions, which have not yet been very definitely explained, cases of poisoning similar to those which have been proved against the saccharine kinds of sorghum have been attributed to Johnson grass, itself a sorghum. Being essentially a summer grass, it is not likely to spoil a hay crop, as wild oats and other foreign plants would do. It blossoms and pushes its seed head upwards after the corn crops have been harvested. Mr. Hamersley is satisfied with his experiment, and his further observations with respect to the carrying capacity of the field should be interesting. At the time of my visit the grass was 2ft. to 5ft. high. It had been sown late in October on fallowed land, never cropped or manured. It is likely that the stocking up of the field, especially with the heavier kinds of farm stock, may check the growth of the grass on account of the crushing and bruising of the succulent underground runners by the hoof of the grazing stock. In that case, it would be found advisable to cut the green stuff, let it wilt for a few hours in order to cause a change in the chemical compositions of the injurious substances in the stem of the grass, and feed it away from the field. In the case of sheep and pigs, the grass may be grazed on the ground without causing the same amount of injury.

Paspalum Field.—In the same field, and alongside the Johnson grass, were several acres of paspalum. Eight pounds of seeds were sown to the acre, also on new land fallowed, but never cropped or manured. The field

had not yet been stocked in February. The *paspalum* was rather patchy, and Mr. Hamersley expresses the intention of sowing Italian rye grass among it in the autumn, so as to fill the gaps. The soil is a light loam overlying rubble, with granite outcrops here and there. It is typical of the jam country of the Eastern districts. Although not so pronounced a success as the Johnson grass field, yet this *paspalum* plot will also provide a useful change for stock, when all feed around is dry and unpalatable.

SOUTHERN DISTRICTS.

In March last I visited Boyanup for the purpose of making an examination of the green summer pasture entered by Mr. John Duce. The area of the field entered was 28 acres. It was once under red gums and jarrah, with a certain amount of blackboy and stinkwood undergrowth. Patches of sage and rush on the lower lying land, and a few scattered Christmas trees on the lighter parts, are indicative of large stretches of similar country in the Southern district. The land had been ringbarked ten years, and had never carried much succulent feed. The pasture in its natural state may be said to be practically worthless, except after a bush fire, after which a fresh growth of the naturally coarse scrub provides fairly good feed for a while. Clearing and cultivating soon, however, operate a transformation on this unprepossessing country. The land has hitherto cost £8 per acre to grub and clear. With the aid of mechanical appliances and chemical explosives, this cost should be much reduced. Of the 28 acres entered, 12 acres had been sown with lucerne six years ago, but the water table, which is high on the Boyanup plain in the winter, killed the crops. A great number of plants, however, still survive, and were growing with much vigour. Last season, half of the field was ploughed in the autumn, the other half being ploughed in the spring. On this ploughed land, a good dressing of chemical fertilisers, consisting of 1ewt. each of sulphate of potash, sulphate of ammonia, and superphosphate, was disced in in the spring; the field was then drag-harrowed. The seeds were then disced towards the end of October and the beginning of November as follows:—*Paspalum dilatatum* 12lbs., Rhodes grass 1lb. per acre, with 1ewt. of superphosphate mixed. The hoes were taken out of the shoes of the drill, so as to leave the seeds on the surface. The field was then rolled and shut down until the time of my visit in March. On close examination it was apparent that the portion ploughed in the autumn showed a better stand of grass than the other portion ploughed in the spring. The land had been consolidated by the winter rains, whereas, in the other case, it had not been firmed so well, and the young roots had not had time before the summer to properly establish themselves. The spring ploughed part had been once under lucerne, but not withstanding this preparation, the result was not so good. It had also been sown later than the autumn ploughed part, probably too late. In December, cut worms and other grubs were prevalent, although not so noticeable on grass. Although a few bare patches showed in the field, the grass had been well seeded. It was noticeable that although 1lb. of Rhodes was used for twelve of *paspalum*, the former showed how much better it germinates. It was also very noticeable that along the wheel tracks of the drill, and where the hoof prints of the horses were left on the land, there the *paspalum* came up thickly. The same thing



A WESTERN AUSTRALIAN FARM.
Cattle in the stubble, Walkaway.

GOULDING
PERTH

was observed in the water furrows, where the soil had settled firmly. This firming of the land brings the rising moisture in the spring into closer contact with the seed and the young rootling, which then is able to establish itself. Mr. Duce, who has ever since he settled at Boyanup taken a keen interest in the establishment of summer pastures, intends to gradually grass his surrounding land. He will on the ploughed land, properly pulverised, use the T bar roller, then sow the seeds with some fertiliser, run a light harrow over the field, and then roll it again. The cost per acre of this summer pasture is as follows:—Clearing, £8; fencing, £1 3s.; fertiliser, £2 0s. 6d.; seeds, 16s. 3d.; labour, 18s.; total, £12 17s. 9d.

That the stock-carrying capacity of the pasture is increased over ten-fold as compared with the land around, is made evident. By light feeding, liming, and sowing in the autumn 1lb. or so of Dutch white clover and Birdsfoot trefoil, or a few pounds of Italian rye grass over the pasture, after discing the bare patches between the more tussocky grass would be filled, and a pasture of high value established on what had hitherto been a cold, hungry piece of land, water-logged in the winter, and as hard and dry as bricks in the summer months.

METHODS OF DESTROYING RABBITS GENERALLY ADOPTED.

By ALEX. CRAWFORD, Chief Inspector.

Phosphorised pollard is by far the most effective and one of the cheapest, and if mixed according to the directions given in this paper there is no danger whatever of the baits catching fire after being laid out.

I would here give a word of warning. Phosphorous is highly inflammable, and if care is not taken in handling serious burns would be the result. It should never be touched with the hands, and should be always cut up under water.

If by any accident phosphorous should get on the hands, plunge the hands into water at once if possible, and with a small bit of rag wipe the phosphorous off the hands under water.

Strychnine and arsenic are good poisons, and very adaptable for poisoning twigs or poisoning water.

Toxa is a very good poison, and is very useful for small farmers who would possibly only require small quantities of poison.

S.A.P. is also a useful poison ready for immediate use.

Cyanide of potassium for poisoning water is a cheap and efficient remedy for destroying rabbits in dry areas, especially where waters at which the rabbits have been used to drinking can be fenced off with wire netting.

Other methods of destroying rabbits are by traps, and with these an experienced trapper can do good work.

Dogs will be found of great service. Fox terriers and Irish terriers are very good dogs for scenting up rabbits, and the ordinary kangaroo dog for catching after the rabbit has been put up.

For distributing phosphorised pollard no machine has been found to equal the "I.X.L." poison cart.

Where any colonies of rabbits have become established the men should say two or three days after poison had been laid, dig out all the burrows.

DIRECTIONS FOR MAKING AND USING DIFFERENT POISONS.

Phosphorising Pollard.

Ingredients:—About 2 gallons of water, stick of phosphorous about 7 or 8 inches long, 4 or 5lbs. of dark sugar, but molasses is considered the best as not so liable to harden, 3 parts pollard and 1 part bran thoroughly mixed together, bi-sulphide of carbon.

Note.—In dealing with Phosphorous it must always be handled under water, as on exposure to air it is liable to catch fire.

Nearly fill a glass jar with water (a pickle bottle would answer), cut a stick of phosphorous into about 5 pieces, but I may mention in cutting it that the phosphorous must be covered with water in a shallow dish, otherwise if left out of the water it immediately takes fire. Put the cut phosphorous into the glass jar containing the water, and pour into same two tablespoonfuls of bi-sulphide of carbon, and the phosphorous will be dissolved in a very short time. Dissolve the sugar in about 4 quarts of hot water, and mix it thoroughly with the balance of cold water, after which pour in the dissolved phosphorous stirring it well with a stick, then gradually add the mixed pollard and bran, stirring it all the time until it becomes the consistency of a thick dough, so that it will not stick to your fingers, and when in this condition it can be kneaded up with the hands without any fear of it burning those mixing it.

When in a proper condition baits of the required size can be cut; if for hand distribution, about the size of a walnut, or even smaller.

In laying baits it is always advisable to run out a shallow furrow and drop the baits in. Rabbits are readily attracted to the newly turned earth, and will follow the furrow up, and consequently are much more likely to get the baits than if they were just thrown about without any furrow.

In fairly soft ground, if no proper appliance is procurable, a very good furrow can be made with a fair sized stick, a dutch hoe or a mattock.

Keep the tin of phosphorous and bi-sulphide of carbon in as cool a place as possible away from the house, and I repeat that the phosphorous must always be in water. The bi-sulphide of carbon should be kept well corked, otherwise it will evaporate. If the latter liquid is not available the phosphorous can be dissolved in boiling water.

Poisoning Twigs.

There are two methods adopted:—

- (a.) Dissolve $1\frac{1}{2}$ ozs. of strychnine in 1 quart vinegar (or one-fifth of this quantity of acetic acid), then add to this 5 gallons of water. Add 2lbs. flour and 1lb. of sugar to form a thin paste.

- (b.) Use $1\frac{1}{2}$ ozs. of strychnine to 1 gallon water, and 2lbs. flour and 1lb. sugar, to form a thin paste. In this the strychnine should be ground between two pieces of glass before being placed in the water, as otherwise it will not be held in solution.

The mixture is applied to the twigs of bushes that stock eat, either by means of a brush or dipping them in the solution.

After preparation all that is required to be done is to scatter the poisoned twigs wherever the rabbits exist.

Special attention is called to the possible danger to stock if the poisoned leaves are left where there can be free and unguarded access to them, as stock will eat the leaves but refuse the twigs, which are, however, readily eaten by the rabbits. This danger can be avoided by spreading only the poisoned twigs. A few unpoisoned leaves may be left, however, attached to the twigs, to attract the attention of the rabbits.

Chaff and Arsenic.

Thirty lbs. best green chaff, 2lbs. arsenic, 3lbs. sugar, 1 gallon water. Obtain a large zinc-lined case and spread about 10 or 12 lbs. of chaff evenly at the bottom. Boil the water and mix sugar in it. Then sprinkle the water over the chaff and shake in the arsenic in pepper-box fashion and mix thoroughly. It is only necessary to damp the chaff sufficiently to make the arsenic adhere to it. This mixture should be spread at once, as rabbits will not eat poisoned food which has changed its natural appearance from fermentation or any other cause.

The use of above is not strongly recommended. It will only be found to succeed where there is a great scarcity of feed, and it is always most dangerous to stock.

Grain and Arsenic.

Fifty lbs. grain, 1lb. arsenic, 4lbs. sugar, $1\frac{1}{2}$ gallons of water. Put the arsenic and water into a suitable boiler, adding $\frac{3}{4}$ lb. washing soda. Boil till thoroughly dissolved, when the water should become tea-coloured and no white sediment should be visible on the stirring stick. Add the sugar and then pour the contents over the wheat or oats. Leave the mixture in a tub or vessel for about 12 hours, when all the liquid should be absorbed. The grain can then be spread on bags or iron to dry when it is fit for use or for putting in tins for future use. In some instances the grain will absorb more water than is mentioned above, but this can be regulated.

This mixture will be most useful to persons who are, perhaps, afraid of using phosphorous on account of possible risk of fire in using the latter. However, there is only danger in the latter case when badly mixed. If the phosphorous is dissolved in carbon there is no risk even with imperfect mixing. The killing properties of the arsenized grain is equal to strychnine. The use of the washing soda is strongly recommended, as it increases the absorption.

Apples or Quinces and Strychnine, and Carrots and Strychnine.

Cut into small pieces (an ordinary apple should make 50 or 60 baits). Dust with 1oz. of strychnine to 10 or 12 lbs. of fruit, say with a large-sized pepper castor. It is a good plan to mix some pollard or flour with the strychnine, so that it will not dust too thickly or freely. Lay in the plough furrow

from 6 inches to 3 feet apart, according to the infested state of the place. The advisability of "free feeding" several times beforehand where above poison is to be used cannot be too strongly recommended, in fact it is almost essential to success. If the free baits are well taken, success is absolutely certain. The rabbit comes to the furrow eager and unsuspicious, and falls an easy victim. On the other hand, if the free baits are not taken, there is obviously no use in laying the poisoned bait, and some other poison should be tried. In cases where the furrows cannot be readily made, good work can be done by laying the poison on scratches similar to those made when trapping. This also applies to other baits, grain or pollard. When poison is taken, the furrows should be replenished until the rabbits cease to take it. It is hard to err on the side of liberality, but very easy to do the opposite. It is far better to have some poison wasting in the furrows than to have a few rabbits left for future breeding.

Carrots, Apples, etc., and Arsenic.

Twenty lbs. apples or carrots and 1lb. arsenic; sift the arsenic on dry with a dredger. When using carrots it is advisable to lightly damp them in a thick solution of sugar. With apples this is not necessary, as there is sufficient acid in the apple to absorb the poison.

Jam and Strychnine.

Eight lbs. jam (any kind) and $\frac{1}{2}$ oz. of powdered strychnine; mix well and lay on a small piece of bark or wood in a ploughed furrow.

In this connection the use of the prepared jams on sale by manufacturing firms is recommended, in view of the fact that a small quantity goes a long way, and the cheapness and certainty of the manufactured article. In country where ants are plentiful it is expedient to put the jam down as late in the evening as possible, as this insect readily finds it, and is objectionable to the rabbit.

Method of Laying Poisons.

For any poisoning, undoubtedly the furrow or scratch is far and away the best. Nothing can equal it for certainty. The attraction to the rabbit is irresistible. It will always come to it to play and scratch on, and therefore must find the bait sooner or later. But when the country does not allow of the use of the plough or the sledge the soil should be upturned by other means. Cases have been noticed where the top of the ground has been smoothly taken off, and the poison laid thereon. This is not advisable—the ground should be broken, not smoothed over. As a rule, the poison is not so freely taken if laid too near the burrows. It is much more certain if put on their feeding and playing ground.

It is often advisable to "ring the changes" as regards poisons. What is successful one time may not be so another. The rabbit is somewhat fickle in his tastes according to a variety of causes, such as weather, seasons, and the state of his natural feed, and it is a good thing to find out what it may take best at that particular place or time, and indulge in it accordingly.

Great care should in all cases be exercised as to cleanliness in preparing poisons and laying same. The rabbit is cleanly, and keen to detect anything suspicious in the food spread for it.

Poisoning operations, however successful, should always be followed up by other means. There is always a percentage of vermin left quite sufficient to breed up again. These should be got at by digging out, fumigation, or by setting traps in the mouths of the burrows (so that the breeding does and young rabbits be also caught), and not on the runs or "buck-heaps," etc., and the doe mostly escapes to keep up the future supply. No trapping will lead to anything like a satisfactory result unless the burrows are thoroughly worked. But it is undoubtedly best to always destroy the burrows. No work is complete without this. If these are left the house is always awaiting tenants, and be sure they will find occupants sooner or later. This action, coupled with the destruction of harbor, such as fallen timber, log fences, hedges, etc., is the crux of rabbit destruction, and, if properly followed, must lead to success.

When grass is young or green feed abundant poisoned grain will often be taken when other poisons will not be looked at.

CYANIDE OF POTASSIUM.

Direction for Preparation and Use of the Solution.

One pound of poison is sufficient to treat 100 gallons of water. Formula for mixing:—Dissolve 2ozs. of cyanide in water (if boiling the cyanide will dissolve quicker) sufficient to fill a 2lb. bottle (an ordinary beer or whisky bottle holds 2lbs.) This quantity will poison $12\frac{1}{2}$ gallons of water, which is all that is required for one night at a dam 2 x 1 chains in area. Pure water should be first poured into vessels placed in position outside the netting, which should enclose the water in the dam securely, sufficient space being allowed in the vessels to admit a tablespoonful of poison (mixed as stated above) being added.

The vessels containing the poisoned water should be placed in the most advantageous positions outside of the netting after sundown, and removed at daylight, unless a double line of netting is used, the outer one having apertures to admit entrance of rabbits, but sufficiently small to prevent ingress of sheep, goats, etc. Should such an outer enclosure of netting be erected the poison trough can remain in position until such time as the water in the dam is required for stock.

Troughs to contain poisoned water should be made of black steel, as the chemical action set up by cyanide of potassium when brought into contact with zinc or tin destroys those metals in a short time, whilst it has no effect on iron or steel. A further advantage is gained by the fact that they can be readily cleansed of all traces of poison by being submitted to action of fire. They contain exactly three quarters of a pint, therefore 1 doz. of these vessels equal 1 gallon.

Great care should be taken to avoid inhalation of the fumes when dissolving the cyanide with boiling water, also to prevent absorption through cuts and abrasions on the hands when working therewith, either in a solid or liquid state.

Caution.—Persons using this powerful poison are warned to use the utmost care not to allow children or travellers access to water poisoned by it, and to place it so that birds and stock would not get at it. The poison should not be handled by persons with cuts or abrasions on the hands.

THE RABBIT ACT.

Special attention is directed to the following extract from the Rabbit Act:—

“It shall at all times be the duty of the owner and of the occupier of any land to suppress and destroy, to the satisfaction of the Chief Inspector, all rabbits which may from time to time be upon such land or upon any roads bounding or intersecting the same, or any part thereof.

“Every occupier upon whose land there are rabbits, or signs or marks of rabbits, shall immediately give notice to the inspector whose residence shall be nearest to the land.

“Any owner or occupier who fails to fully and continuously perform such duty, and any occupier who fails to give such notice, shall be liable to a penalty on the first conviction of not more than Ten pounds, and on the second, or any subsequent conviction, of not more than Fifty pounds.”

I would point out that if steps are taken promptly and continuously on the first appearance of rabbits to deal with them, there need be but little to fear, and the expense will not be heavy, but if they are once allowed to get a hold it may be a very serious matter for the settler. It should be remembered that the Act is framed for the protection of the farmers and settlers themselves, and in their own interests they should do all they possibly can to carry out its provisions, and see that their neighbours do likewise.

Permanent Inspectors are stationed at Burracoppin, Cunderdin, Yalgoo, Myadee and Condon, and reports as to the presence of rabbits may be sent to the nearest of these, or to the Chief Inspector, Perth.

The cordial co-operation of all is asked, as it is only by this that the rabbit pest can be kept in bounds at a minimum of cost.

CORRESPONDENCE.

VALUE OF TABLOIDS.

Mr. R. Robinson, of “Rocky Hill Farm,” Brookton, writes to the Department to the following effect, on the value of the tabloids as antidote for poison:—

“I got a bottle of tabloids as an antidote for poisons from you ten months ago. I have used them on several occasions for sheep, both for Box poison and York Road poison, and I have always found them to cure a sheep after they have laid down a time or two. I always find that the poison is bad when you are bringing them out of a poison paddock driving them. Whenever I am driving my sheep out of the paddock which has had poison in I always have a dose of antidote ready, and I always find it cures my sheep. In fact I have saved the lives of nine of my sheep that were nearly dead with York Road poison, and I can honestly say the antidote is a sure cure for poisons (York Road and Box) if you can get water to mix it quick.

Yours truly,

R. ROBINSON.

STOCK DISEASES ACT, 1895.

1. The following Regulations are in force for carrying into effect the provisions of the above-named Act, dealing with all local stock, and relating to the introduction and importation of stock into the State:—

PART A.—INTRODUCTORY AND GENERAL AS TO ALL STOCK.

(1.) Any inspector of stock on receiving information of the existence of disease, or having reasonable grounds to suspect that disease exists, or has within the preceding three months existed in any place within Western Australia, shall proceed to that place with all practicable speed and shall inquire into the existence of disease in such place or in any other place in the manner hereafter set forth.

(2.) He may call upon all persons concerned in or having the charge, control, or management of any such stock suspected or said to be diseased, to give evidence before him as to the facts within their knowledge relating to such stock.

(3.) Any person after having received notice to attend for that purpose shall refuse or neglect to attend, or to answer any inquiries put to him by the inspector under the authority of the Stock Diseases Act, 1895, shall be deemed to have committed a breach of these Regulations.

(4.) If it appears to the inspector that disease exists, or has within the preceding thirty days existed among such stock, or on the land inspected or examined by himself or any other inspector, he shall so determine and shall declare such land to be an infected place, and shall forthwith notify the Chief Inspector, who may cause notice of the fact to be published in the *Government Gazette* and in such newspapers circulating in the district or subdivision where the disease has been ascertained to exist.

(5.) Such notice shall particularly describe the place and area intended to be affected by the declaration, and until released such place and area shall be deemed to be an infected place and area from which no stock, fodder, or fittings shall be removed, except under the direction of an inspector of stock.

(6.) The provisions of this Regulation shall not be deemed to apply to stock infected or affected by a disease other than of a highly infectious or contagious nature.

An inspector on finding stock infected with disease may, as he shall think fit, declare such portions of the land on which such stock may be found at the time of the discovery of the disease a quarantine area within the boundaries of which such stock shall be kept.

The owner of the stock shall pay all charges and expenses connected with the inspection, transporting, quarantining, housing, sustenance, disinfecting, dipping, dressing, or veterinary or other treatment of such stock, in addition to the inspection fees of this State, as prescribed in Schedule No. 3 hereto from the time of their arrival in the waters of this State until they are, as the case may be, released from detention or quarantine, transhipped, or destroyed, and the charges and expenses for transit, inspection, and dipping shall be

calculated on the whole number of stock, and where there are more owners than one each owner shall pay a proportionate share thereof.

All loss sustained with respect to any imported stock while being conveyed to or from or whilst in quarantine, whether by accident or by sickness arising from natural causes, or contracted from other stock, or by the destruction or detention or quarantine or dressing of such stock to prevent the spread of disease, shall be borne by the owner of such stock, and he shall have no other claim for compensation for any such loss.

No person shall enter or leave a quarantine ground without the permission of an inspector, in writing, and every person who shall enter, shall, if the inspector so directs, disinfect himself and his clothes in such a manner as the inspector shall order.

When any stock are ailing or about to be destroyed under the Act or these Regulations, notice thereof shall be given to the owner of such stock to the effect of Schedule No. 4 hereto.

Notices under these Regulations may be either served personally on the person to whom such notice is required to be given, or left at his last known residence or place of business, or sent to him under registered envelope through the post.

Any person receiving a requisition or direction from an inspector under these Regulations shall, with due dispatch, give effect to and carry out the same, and if there be any information or document in the possession or power of any person which is required by an inspector under these Regulations and asked for by him, the same shall be given by such person, and the requisition so made, or any directions so given by an inspector may, if not carried out by the owner, be so done by the inspector at the owner's expense, and the expense incurred may be recovered in any competent court by and in the name of an inspector of stock.

The spread of disease—prevention of.

(1.) Any inspector of stock may, if he deems it necessary for preventing the spread of disease,—

(a.) Prohibit in any district the holding of exhibitions of stock and the sale of stock in public markets and in private sale yards.

(b.) Quarantine all stock straying from a clean to an infected area.

(2.) Where any stock are suffering from disease and there are no means of efficient isolation, the Chief Inspector may order such stock to be killed.

(3.) It shall be unlawful for any person, except for scientific purposes by authority from the Minister, to wilfully communicate, or cause to be communicated to any stock, either of the diseases mentioned in Schedule No. 2, or without the written consent of the Chief Inspector, to inoculate or cause any stock to be inoculated with the virus of any disease, whether such virus be in an attenuated form or not.

(4.) Any inspector may, if he discovers the carcase or part of the carcase of any diseased stock unfit for human consumption in any slaughter-house or place used for the slaughter of stock, or exposed for sale in any shop or market or for exhibition, seize and destroy such carcase or part thereof.

(5.) During period of quarantine no person except the attendant shall, without the permission of an inspector, touch, handle, or come in contact with any stock within the quarantine area, and if any person touches, handles,

or comes in contact with any such stock contrary to this Regulation he shall disinfect himself and his clothes as an inspector shall direct.

Any inspector of stock may require any place, vessel, shed, or yard, where any diseased or infected stock, or stock suspected of being diseased or infected, are or have been kept or to which they may have had access, as well as all vehicles or vessels in which stock have been conveyed, or articles with which they have come in contact, to be thoroughly cleansed and disinfected under his supervision or to his satisfaction.

If any stock affected with any infectious or contagious disease shall be found in any Government or other public pound, or in any yard or in any other place whatsoever at which stock are offered for sale or are exhibited, the owner of such stock so affected shall be liable to a penalty not exceeding Ten pounds. Provided that any inspector of stock may order the withdrawal from sale or exhibition of any stock so affected until such stock have been treated and become free from disease. Provided also that every owner who refuses, neglects, or fails to comply with the directions of the inspector shall be liable to a penalty not exceeding Twenty pounds. But if such stock are intended for immediate slaughter the inspector may exercise his discretion and give an order for them to be slaughtered accordingly.

The owner of any stock shall, when required by an inspector, forthwith muster his stock in some convenient place, yard, or crush as the inspector may direct, and if he is not satisfied that the whole of the stock have been so mustered, may employ any person or persons to assist him in the thorough examination of the stock of such owner, and the expenses of, and incident to, such examination shall be paid by the owner thereof.

No inspector shall be liable for any loss or damage occasioned to any owner of stock by any act of such inspector unless such damage shall be occasioned by his wilful neglect or default.

If any inspector shall receive any payment or consideration for the performance of any act, matter or thing authorised or directed by the Act or these Regulations other than the salary payable to him, he shall be dealt with as the Chief Inspector may direct. But nothing herein contained shall prevent any inspector from demanding or collecting any fees or charges authorised by the Act.

No inspector shall be either directly or indirectly a dealer in stock, or shall act as the agent of an owner or dealer in stock, in the district or subdivision in his charge.

PART B.—PERTAINING TO STOCK WITHIN THE STATE.

General, re Tick in Cattle (Ixodes Bovis).

The East Kimberly Quarantine area includes all that portion of the Kimberleys eastward of the eastern shore of Brunswick Bay and St. George's basin of the right bank of the Prince Regent River, and of a line therefrom *via* Mount Agnes and the eastern side of the Caroline Ranges, in direction of the Geneni Hills to the meridian of 127 degrees of East longitude and East of such meridian.

All that portion of the State of Western Australia adjoining and extending East of meridian 119 degrees of East longitude, and bounded on the North by 28 degrees South latitude and on the South by 32 degrees South latitude, shall be deemed the goldfields quarantine area.

No cattle shall leave the East Kimberley quarantine area except at the port of Wyndham.

All cattle leaving the East Kimberley quarantine area for any other part of the State of Western Australia shall be shipped direct to Owen's Anchorage, near Fremantle, and shall be landed within either of the prescribed quarantine enclosures—Reserve No. 6320, 195, 360, 402, 314, or 378, where, on landing, they shall be deemed to be quarantined until slaughtered or otherwise disposed of, as directed in writing, by an inspector of stock.

All stock from any other port of Western Australia than the port of Wyndham, and all imported stock carried in vessels which at any time after these Regulations shall come into force, shall have been employed during the next preceding three months in the East Kimberley cattle trade, shall be liable to be treated under the Regulations applicable to cattle shipped from the East Kimberley quarantine area.

No cattle shall be removed from the quarantine areas at Owen's Anchorage unless they shall first have been dipped and a certificate to the effect of Schedule No. 5 obtained from an inspector of stock that the animals have been dipped and are entirely free from tick.

Provided that tick-infested fat cattle intended for slaughter may be trucked by rail, without having been so dipped, to the goldfields quarantine areas, whence they shall not be removed unless and until permission in writing is given by the Chief Inspector, or any one of his inspectors, for their removal, either by road or rail to such other place or places as he may think best within such goldfields quarantine area.

Tick-infested fat cattle shall only be removed in trucks from Owen's Anchorage quarantine areas to the goldfields quarantine area, and such trucks shall be disinfected as required by the Chief Inspector before being returned West of the meridian 119 degrees of East longitude.

All expenses in connection with the disinfection of railway trucks used in the conveyance of tick-infested cattle, and all expenses incidental to the quarantining of such cattle shall be borne by the owners of such cattle, and all disinfections shall be carried out to the satisfaction of the inspector.

Provided also that the expenses incidental to the disinfecting of cattle boats engaged in the shipment of tick-infested cattle from the East Kimberley quarantine area to the Reserves at Owen's Anchorage shall be borne by the owners of such cattle.

All skins and hides removed from cattle slaughtered within the East Kimberley, Owen's Anchorage, and the Goldfields quarantine areas shall be treated as prescribed in Regulation 44. paragraphs (c.) and (d.) of these Regulations.

Any person committing a breach of any of these Regulations pertaining to tick in cattle shall be liable to a penalty not exceeding Five hundred pounds.

General—re Sheep affected with Ticks or Lice.

(a.) Every owner of sheep within the boundaries of the State known as the South-West Division shall after the shearing of such sheep, and before the thirty-first January in each year dip or cause to be dipped in a swim-bath prepared with some specific known to be fatal to ticks and lice all sheep running on land whereof he is the owner or occupier.

Provided that for every sheep not so dipped within the period prescribed above and to the satisfaction of an inspector, such owner shall, on conviction, be liable to a fine not exceeding Two shillings.

(b.) Every occupier of any land in the South-West Division who shall muster his sheep for either of the purposes of dipping or removal from his farm or runs, shall, before yarding the same, give due notice *in writing* of not more than three days nor less than thirty-six hours to the occupiers of all the adjoining lands of his intention so to yard his stock.

Notwithstanding anything contained in these Regulations, it shall not be necessary to dip ewes affected with ticks or lice during such time previous to or after their lambing, as the inspectors may appoint, and for such purpose any inspector may, in respect of such ewes, extend any notice to dip for such time as he shall think fit.

Within seven days after the dipping of his sheep, the owner shall make a statutory declaration before a Justice of the Peace to the effect of Schedule No. 5a, stating that he has dipped his sheep in accordance with the provisions of these Regulations, the date of dipping, number of sheep dipped, and the class of dip used; and he shall forward a copy of such declaration to the Chief Inspector of Stock at Perth and retain the original in his possession for production when called upon to do so by an inspector.

Every person who by himself, his agent or servant drives, without the permission of an inspector, or suffers to stray across or upon any land, or drives, depastures, or suffers to stray upon or along any highway any sheep which have not been dipped according to these Regulations, or affected with ticks or lice, shall be liable on conviction for every day during which such stock shall be driven, depastured, or suffered to stray to a penalty not exceeding Five pounds.

(a.) If an inspector is satisfied that a flock depasturing in any part of the State is affected with tick or lice, he shall give the owner thereof notice to dip such stock forthwith to the satisfaction of the inspector or his agent.

Provided that the owner who refuses, neglects, or fails to comply with such notice on or before the date specified therein shall be liable on conviction to a penalty not exceeding Fifty pounds for the first offence, and if immediately after conviction for the first offence such sheep shall not be dipped to the entire satisfaction of the inspector, such owner shall upon conviction be liable to a further penalty not exceeding Fifty pounds and so on for each and every succeeding conviction.

(b.) If any sheep affected with tick or lice shall be found in any pound, or in any yard or yards, or on any land or other place at which sheep are offered for sale or exhibited for show purposes, the owner exposing the sheep so affected shall be liable to a penalty not exceeding ten pounds: Provided that any inspector, if he deems it necessary, may order the withdrawal from sale of any sheep affected with ticks or lice until such sheep have been dipped or dressed to the satisfaction of such inspector or any other inspector, and shall give notice to the aforesaid owner of such sheep to dip or dress the same forthwith, at such place as the inspector may direct; and every such owner who refuses, neglects, or fails to comply with the aforesaid notice is liable to a further penalty not exceeding twenty pounds. But if the inspector is satisfied that such sheep are intended for immediate slaughter, he may withhold such notice to dip.

Miscellaneous, relating to Swine, etc.

When any person shall have in his possession swine which are diseased or infected with an infectious disease, or showing symptoms of any infectious disease, such person shall immediately give notice thereof to an inspector, and if such swine on examination by an inspector or other authorised person show symptoms of disease they shall be destroyed on the premises where such diseased swine are inspected, and such premises shall be thoroughly disinfected by the owner or occupier thereof under the supervision and to the satisfaction of the inspector.

The carcase of any swine not affected with disease may be disposed of for the benefit of the owner, notwithstanding that such swine may have come in contact with infected swine, provided that an inspector of stock has first certified in writing to the effect of Schedule No. 6 hereto that such carcase is fit for human consumption and use.

No person shall kill any swine whilst impounded in any quarantine grounds without first obtaining the written authority of an inspector to the effect of Schedule No. 7.

(a.) An inspector of stock may, but shall not be compelled, to grant a permit to an owner of swine desirous of moving stock within a quarantine district.

(b.) Prior to the issuing of any such permit, the owner may be required to sign a declaration to the effect of Schedule No. 8.

(c.) All store swine in any infected area not intended for killing, and removed under permit to any place not being a market, shall not be again moved within thirty days from the date of the permit authorising their removal.

Swine moved pursuant to a permit from an inspector to the effect of Schedule No. 9, and offered for sale at any market or saleyard within an infected area shall be offered on the vehicle by which they have been conveyed, and such swine may be removed to another vehicle and conveyed to the purchaser's land.

Provided that when yards or pens are specially prepared in such saleyards or markets, such swine may be permitted to be placed in such yards for sale.

Every cow-keeper or occupier of a dairy farm, or any person in charge thereof, which an inspector of stock may visit for the purpose of inspecting any cattle or cow-shed thereon, shall afford every reasonable assistance that may for the purpose of such inspection be required of him.

Regulations pertaining to Hides and Skins.

Every person who receives any stock, hides, and skins for sale, or disposes for or on behalf of any other person, shall—

(a.) Make in the manner prescribed and during a period of twelve months from the date of such receipt, keep a record of the description of the stock, hides, and skins and of the brands and marks thereon, and of the name and address of the person from whom he received the same.

(b.) At all reasonable times within the said period produce any stock, hides, and skins which are in his possession for sale or disposal as aforesaid, or any such record for the inspection of any justice, inspector, or member of police force on demand, and permit any such person to take a copy of or extract from any such record.

- (c.) All hides of cattle, horses, or camels shall be fully opened out with the hair or outer side lowermost on a properly prepared floor of concrete or other impervious substance on which a layer of salt has been spread. The inside shall be covered with strong, coarse dry salt to the extent, on an average, of not less than 12lbs. to each hide, and they shall be built up greenside to greenside and salted in this way until a stack is formed, from which the brine is allowed to drain freely off. The hides shall remain in the stack seven days.
- (d.) When salted, each of the hides or skins shall be turned in from the head, then from the butt, and then so folded up that the salt shall be retained and every part of the green side of the skin or hide shall come in contact with the salt.
- (e.) All skins of sheep, kangaroos, or of any other animals shall be dressed with an arsenical solution and sun or wind dried.

No person shall sell any sheepskins to which both of the ears are not attached, or from the ear of which more than one-fourth is cut off.

All live stock intended for exportation shall, prior to embarkation, be examined by an inspector, and a fee levied for such examination in accordance with the scale of charges hereunder.

Provided that the whole amount of fees for inspection of any one shipment by the same owner shall not exceed £5.

	s.	d.
For horses, asses, cattle, and camels, one to three head ..	5	0
For every additional head	1	0
For sheep, swine, and goats, one to 50 head	5	0
For every additional head	0	1
For each dog	2	6
For every additional head	1	0
For each consignment of poultry	2	6

PART C.—INTRODUCTION OF COMMONWEALTH AND NEW ZEALAND STOCK.

All stock imported into Western Australia from any State of the Commonwealth or from New Zealand may, notwithstanding the provisions of Section 13 of the Act, be admitted into this State on the certificate of a Government Inspector, in addition to a declaration to the effect of Schedule No. 10 by the owner or breeder of the stock or the manager of the farm or station from which the stock came, stating that such stock were at the time of departure from his farm or station or had been for three months next preceding to the best of his belief free from disease, and had not for such period been in contact with diseased animals.

Provided that should such stock arrive at a port of landing in this State without the aforesaid certificate and declaration, and the inspector is satisfied that such stock are free from disease, he may permit the landing of the stock on the sworn declaration of the owner and the payment of a fee of ten shillings in addition to the fees provided for in the Schedule No. 3 hereto.

Exemptions: Conditional.

(a.) Cattle intended to be introduced into this State from the State of Queensland may be permitted to land subject to the provisions prescribed under these Regulations, controlling the spread of disease known as Cattle Tick (*Ixodes Bovis*).

(b.) Sheep intended to be introduced into this State from Queensland shall be subject to quarantine for a period of fourteen days, and shall not be permitted to land at any port in this State other than the port of Fremantle.

(c.) Swine are not permitted to be introduced into this State from any of the States of the Commonwealth, and only such pigs having a registered Stud Book pedigree may be admitted from the Dominion of New Zealand.

Any State shall, as regards any particular kind of stock, be deemed clean if the introduction of that kind of stock or stock of a different kind, but liable to be infected with the same disease, is not prohibited from being introduced from such State in terms of these Regulations.

Any stock from the States which may be lawfully imported by sea shall not be landed at any port other than Fremantle, Champion Bay, Eucla, Hope-toun, Albany, Bunbury, and Esperance unless they shall have been first inspected and passed by an inspector of stock at any one of the aforesaid ports.

In the case of stock from any of the States intended to be introduced into this State, it shall be necessary for the owner of such stock to give notice thereof to the inspector of stock in the district into which they are intended to be introduced to the effect of Schedule 11 hereto, such notice to be delivered not less than seven days before the introduction of such stock.

The crossing places for stock intended to be introduced into this State from any of the other States shall be at the Newry Station, Negri River, and Cockatoo Spring for districts for the northern portion of the State, and for districts in the southern portion of the State the only crossing place shall be where the present road crosses the border at a point about eight miles distant in a north-easterly direction from Eucla.

If the inspector for this State at a crossing place on the border receives notice from the owner of any stock that he intends to cross such stock on a date therein mentioned, and the stock are not presented at such crossing place for inspection on the date stated, whereby the inspector is unnecessarily detained at the said crossing place, or if an inspector is called upon to inspect any stock for which the owner has neglected to obtain a certificate required to be produced to the inspector of this State, the owner of such stock shall pay the inspector on demand the expenses incurred by him through such unnecessary detention, or in making such inspection, in addition to the fees prescribed in Schedule No. 3 of these Regulations.

PART E.—PENALTIES AND CONFISCATIONS.

Penalties.

Any person who shall commit or attempt to commit, or be concerned in committing or attempting to commit a breach or violation of, or shall neglect to comply with any of the foregoing Regulations for which no special penalty is provided, shall for every such offence, upon conviction thereof, be liable to a penalty not exceeding Twenty pounds.

Any person who knowingly signs any declaration or certificate required by the Stock Diseases Act, 1895, or the Regulations thereunder, which is false in any material particular is, under the provisions of the Criminal Code, guilty of a misdemeanour.

Any person who removes, destroys, or damages or in any way interferes with any marks, notices, gates, or fences made, posted, or erected as being necessary for the better administration of these Regulations, shall be liable on conviction to a penalty not exceeding Twenty pounds.

(1.) All penalties for any breach of this Act or Regulations thereunder, and all moneys due and payable under this Act may be recovered in a summary way before a stipendiary or police magistrate, or any two or more justices of the peace on information or complaint by any inspector of stock, owner, or occupier, or by any person authorised by the Minister in that behalf.

(2.) Whenever any expenses, fees, costs, or charges have been incurred by an inspector under these Regulations, he may sell the stock, fodder, or fittings in respect of which the same were incurred for the purpose of defraying all or any such expenses, fees, and charges.

Stock, fodder, fittings, or effects, as the case may be, may under all or any of the following circumstances be destroyed or otherwise disposed of, as the Chief Inspector of Stock shall direct:—

- (a.) If stock are infected with any infectious or contagious disease, whether they be on land or on board any vessel within the territorial limits of this State.
- (b.) If any foreign stock, fodder, fittings, or effects are landed in contravention of these Regulations.
- (c.) If any foreign stock, fodder, fittings, or effects which are prohibited are landed.

PUBLICATIONS RECEIVED.

- Report on Botanical and Forestry Department, Hong Kong, 1908.
- New Zealand Romney Marsh Flock Book, Vol. V.
- Report of Chief Veterinary Surgeon, Cape Town.
- Official Testing of Breeding Cattle for export from The Netherlands.
- Report on Forestry Branch, 1907-08, New South Wales.
- Fungus Maladies of the Sugar Cane. Experimental Station, Hawaii.
- Records of the Australian Museum, Sydney, Vol. VII., Part 4.

WESTER AUSTRALIAN CROPS AND LIVE STOCK RETURNS, 1908-9,

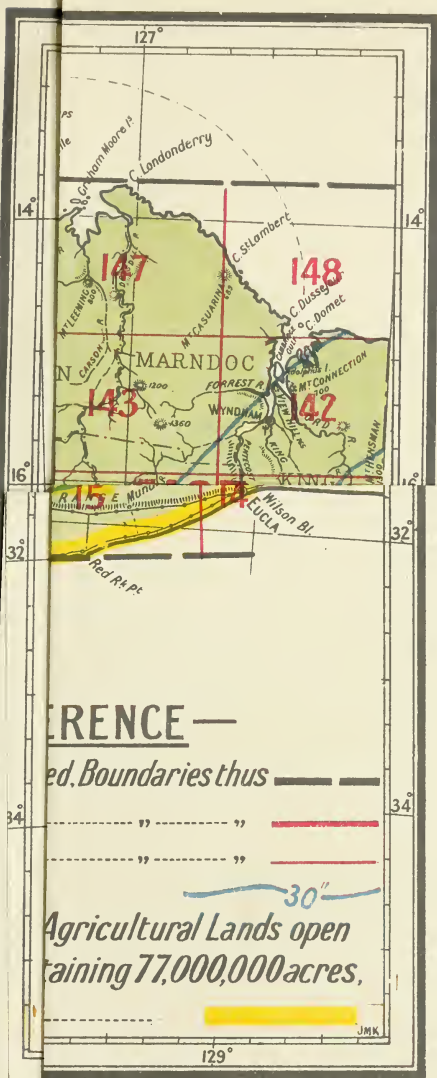
(By MALCOLM A. C. FRASER, Government Statistician.)

The information contained in the reports collected from police officers in the different agricultural districts, has already been published in the *Journal*.

The report should enable both agriculturists and pastoralists, present and to come, to form an accurate idea as to the indisputable advantages which the lands of this State offer to them. To do so, they have only to take into consideration the fact that the season under review is, apparently, one of the worst that Western Australia has experienced for a period of 12 years. A careful perusal of the unbiassed reports of the various collectors, and a study of the rainfall records for the various districts of the State, will show that, even against exceptionally trying climatic and other conditions, the land of the State has more than held its own. It will readily be understood that, owing to the largely increased amount of new ground lately broken and put under crop by inexperienced and, at present, unacclimatised selectors, both also often without the necessary means to obtain the best, or even a fair result, the actual capability of the land was bound to suffer, even if the exceptionally unfavourable circumstances of the season are not taken into account. So soon as these selectors have realised, by experience, what is necessary to obtain the best results under any circumstances likely to arise, then, and then only, will the capabilities of the land be done full justice to, and fair average results be possible. Consequently, until normal conditions prevail, it can hardly be expected that the average production of the land will represent its real value.

Breadstuffs.

From the figures for 1906, 1907, and 1908, supplied by the Railway Department, the millers, merchants, bakers, storekeepers, and settlers, it would appear that the average amount of grain and flour (the latter reduced to its equivalent in wheat) carried forward at the end of each of those years was 582,073 bushels, or an annual supply of slightly over three months' consumption at the rate of eight bushels per head per year, which latter figure has been found to practically represent the average amount used during the past 10 years for human consumption and other feed purposes, the exact figure for that period working out at 7.98. According to Mulhall, the average annual amount of grain per head consumed by the population of Europe is "almost seven bushels." The special circumstances of life in Western Australia, however, considering the preponderance and pioneering condition of its adult male population would undoubtedly raise this, as would still further the fact that the figure, eight bushels, also includes the amount used as food for stock of all descriptions, such as horses, pigs, poultry, etc. It is evident from these figures that a carry forward to approximately the above extent for



within the sheetlines of the Standard Plans of the Survey Department. Being permanently fixed, they are units that can be readily sub-divided and re-grouped at any future time into new districts and sub-districts without impairing their use for comparative purposes.

Government Lithographer, Perth, W. A.



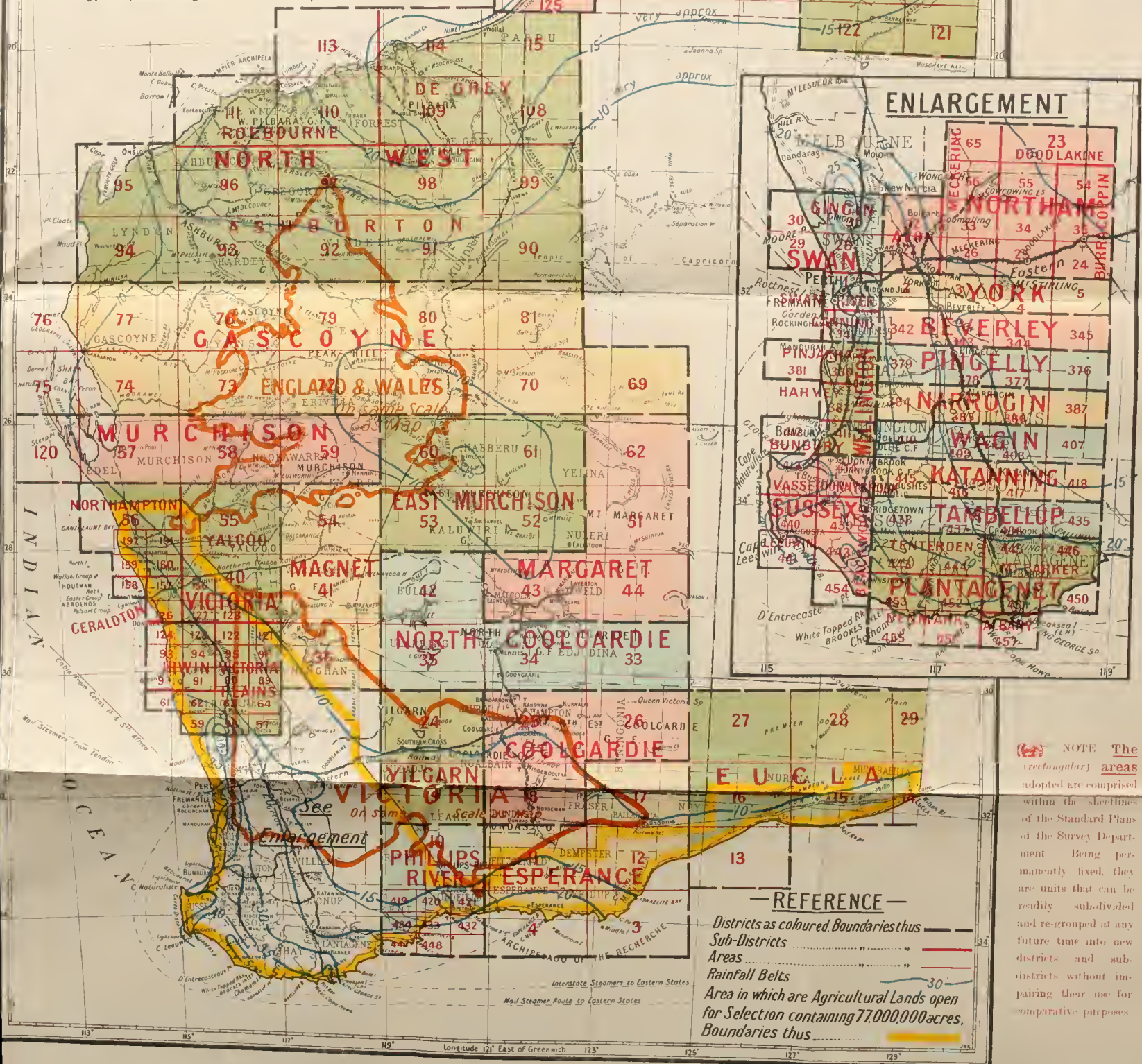
Harry F. Johnston
Surveyor-General

MAP OF WESTERN AUSTRALIA

Showing
Statistical Districts, Sub-Districts & Areas.

Scale of Miles
50 40 30 20 10 0

NOTE: Except where the Areas are broken by the sea coast, or other cause, those numbered in large red type represent areas of 8437½ sq. miles, those in small red type representing areas of 937½ sq. miles.



NOTE The (rectangular) areas adopted are comprised within the sheets of the Standard Plans of the Survey Department. Being permanently fixed, they are units that can be readily sub-divided and re-grouped in any future time into new districts and sub-districts without impairing their use for comparative purposes.

next year is probably as necessary as it has been in the past, practically balancing the carry-over at the beginning of the year, and the estimated figures are accordingly used below. The actual carry-over at the beginning of the present year, from the returns sent in, was 627,402 bushels. The following table should then show clearly in detail the present situation :—

Old supplies carried over from 1908, in bushels of wheat*	627,402
Crop, 1908-9, bushels of wheat	2,457,483
<hr/>	
Total available for 1909, bushels of wheat ..	3,084,885
Exported since January 1, 1909, bushels of wheat	666,297
Balance available, all purposes, bushels of wheat	2,418,588
Required for seed, 1909, bushels of wheat ..	*550,000
<hr/>	
Available for food, man, beast, and bird, during 1909, bushels of wheat	1,868,588
<hr/>	
Required for food, man, beast, and bird during 1909, bushels of wheat	†2,192,000
Required to be imported for general supplies, 1909, bushels of wheat	323,412
Required for average carry forward for three months' general supplies, 1910, bushels of wheat	††582,073
<hr/>	
Total required to be imported during 1909, bushels of wheat	905,485

*Quantities of flour have been reduced to their equivalent in wheat, and added to the quantities of wheat.

**Allowing for 1.1 bushel to the acre, the average disclosed by previous returns, and also for a similar increase in acreage to that experienced last season.

†At 8 bushels per head of mean population.

††Allowing for a decrease in consumption owing to scarcity and possible high prices.

It will be noticed that in the carry forward into 1910 the three years' average adopted as the estimated amount required is lower by 45,329 bushels than the amount actually carried over at the beginning of the current year. The estimate of requirements, therefore, would appear to be based on moderate lines, as under ordinary circumstances, the population and stock having increased, it would be reasonable to assume that a proportionate increase instead of a decrease in the old figures should be provided.

Any quantities already imported, namely, 45,812 bushels (including flour) to the end of June last, should, of course, be deducted from, and so reduce the amount, 905,485 bushels, given as the total required to be imported before the end of 1909. In this connection it must also be noted that during the first half of the current year, a quantity of 154,341 centals of bran, pollard, and sharps was imported, at a cost of £33,888, representing approxi-

mately 771,705 bushels of wheat, not grown in the State, of which it was the by-product. Consequently it would appear to me that if it had been found possible, in the first instance, for the State to have exported the flour produced by an equivalent of this quantity of wheat, instead of the grain itself, it would have been unnecessary to import this by-product, whilst the payment for the labour of its reduction to flour would have been retained by the State mill employees, and the freight and shipping charges saved. As regards the question of using the figures in connection with the "carry-over" at the end of the year 1908 and "carry-forward" at the beginning of the year 1910, although I have used them above, I am still of opinion that for all practical purposes the two may be left out of the question, and considered as so nearly balancing each other that they are practically negligible, and in this it would appear that I am borne out by the *South Australian Advertiser* in its issue of July 16 last."

Attached is a map showing the various statistical districts, sub-districts, and areas. A very useful feature is, that by taking the number of any district shown on the map and referring to the name of the locality with a corresponding number in any of the tabulated returns one may ascertain at a glance how the different localities compare in respect to their productiveness, in crops or live stock, and can learn the relative importance from an agricultural point of view between any two areas of equal size on an equilineal position.

INTERNATIONAL FOOD CONGRESS.

Professor Loudon M. Douglas, of Edinburgh, has forwarded to us the programme of the Second International Congress for the Repression of Adulteration in Food and other products, which will be held in Paris on 24th October under the auspices of the White Cross of Geneva.

Writing on the subject, Professor Douglas says:—

"May I say that so far as we can see at the present moment, there are likely to be representatives present from every civilised country, and official delegates have been appointed by many governments.

"The particular object of the Congress is to define what operations are permissible in the handling of food and which follow upon the definitions which were accepted at the Congress held at Geneva last year.

"This programme is incomplete inasmuch as it does not contain the definitions and recommendations which will be put forward by the English-speaking world (The United States, The United Kingdom, The British Colonies, etc.) These, it is hoped, will form the subject of a supplementary programme which will be issued prior to the Congress. In this connection I shall be glad to have sent me at the earliest moment such definitions or contributions, in the shape of papers, on matters cognate to the subjects to be discussed.

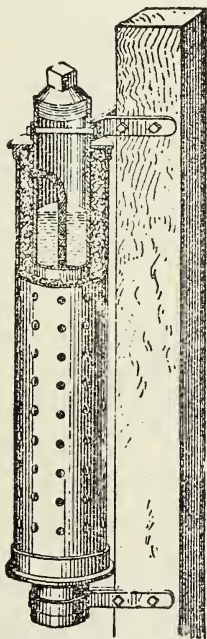
"The interest which has been aroused by this attempt to control the processes in use in connection with the manufacture of food products has been universal, and a very strong effort will be made to translate the findings of the Congress into legislation in the various countries represented.

"The Congress will not only deal with ordinary food products, but will also discuss the methods of prevention of adulteration in chemical products, drugs, essential oils, spices, mineral waters, etc.

"The invitation to become delegates is extended to all who are in any way connected with the food supply:—Pharmaceutical Associations; Medical Officers of Health; Sanitary Officers; Chemists; Hygienists; Provision Manufacturers; Cocoa, Chocolate and Tea Merchants; Wine and Spirit Merchants; Distillers; Meat Purveyors; Ham and Bacon Curers; Sausage Makers; Agricultural Colleges; and generally, all who in any way, have anything to do with the preparation, distribution, or control of alimentary substances."

RUBBING POST FOR STOCK.

An inventor living in Nebraska has carried the automatic idea to the extent of enabling live stock themselves to apply insecticide, or soothing oils to parts that are irritated or affected by vermin. The invention consists of a rubbing post in which is a reservoir filled with the insecticide, and which may be placed at any suitable place convenient to the live stock. The rubbing post



is formed with a central reservoir in which the oil is kept. Between this and the outer casing of the post is a felt-like filling. A wick serves to carry the oil from the reservoir to this filling. The outer casing of the post is perforated so that when the animal rubs against it the oil will exude from the perforations and be spread upon the affected part.

IRISH BLIGHT.

REPORT BY VICTORIAN PATHOLOGIST.

Mr. McAlpine, Victorian Government Pathologist, has given the following report on this disease:—"On my return from Tasmania I immediately set to work on the diseased potatoes, and a microscopical examination of the brown or rusty portions revealed numerous filaments of a fungus interlacing among the cells and characterised by being without joints. When slices of such potatoes were kept moist under a bell jar, there grew out from these filaments the fruiting branches of a fungus. 'By their fruits we shall know them' is as true of fungi as of human life, and there is no mistaking it to be the fungus which causes the Irish Blight in Britain and elsewhere, and that which occurred on the diseased leaves sent to me from Brisbane, viz., *Phytophthora infestans*. Some of the potatoes simply kept moist in a sink developed the fructification, and others sent over from Tasmania in a box showed it on the surface of the skin at once. The cause of the brown rust then is a definite fungus."

POTATO BLIGHT PRECAUTIONS.

Following on the discovery of the blight at Kyogle the New South Wales Department of Agriculture has been prompt in issuing a leaflet defining the precautions which should be taken to insure that only sound tubers should be planted. These directions will enable growers not only to protect themselves against blight and scab, which is nearly as bad, but will enable them to reject seed potatoes which are deficient in constitutional vitality.

The following are the directions given:—

Most carefully hand-pick all tubers intended for seed, and after rejecting any doubtful ones and completely destroying them by fire or boiling, immerse the rest for two hours in a solution of eight ounces (or half a pint) of commercial formalin to fifteen gallons of water. This quantity will be sufficient to test 10cwt. of tubers. Commercial formalin may be obtained in country districts at about 2s. per pound bottle, or 14s. per gallon; so that, roughly speaking, the seed potatoes can be treated for 2s. per ton. Before placing the potatoes in the formalin solution they should be very carefully washed in water so as to remove all particles of soil, etc., and the water in which such tubers have been washed should afterwards be boiled to avoid risk of scattering any of the germs on the soil, or over clean potatoes. For the solution any kind of vessel may be used, as it does not corrode metal. Formalin is poisonous, and, therefore, ordinary precautions should be observed in its use. It may also be likely to somewhat retard the development of the eyes; but if,



POTATO BLIGHT (*Phytophthora infestans*).

Diseased Leaf and Tuber.

used with due care, and not longer than the time indicated, no bad results need be anticipated. Very small, thinly cut sets might be affected by the formalin.

Growers cannot be too emphatically advised to avoid the use of second-hand potato bags. If any containing seed have recently been brought to the farm, the potatoes should be carefully removed, and the bags and particles of rubbish in each should be boiled for at least half an hour. Care should also be exercised as to the disposal of the potato peelings and rejected portions of tubers from the kitchen.

ROOT CROP GERMICIDES.

A New Zealand farmer claims to have steered clear of potato blight and diseases in other root crops by steeping the tubers in a solution before sowing, made up of 6lb. of sulphate of ammonia and 6lb. of nitrate of potash dissolved in 25 gallons of water, approximately 4oz. of each to a gallon of water. The seed is soaked for twenty-four hours, and in the case of potatoes allowed to dry for another twenty-four before planting, to avoid mildew.

POTATO BLIGHT AND SPRAYING.

(*N.Z. Dairyman.*)

The nature of potato blight should be studied by potato-growers before attempting to spray to prevent the disease. This disease, which is caused by a minute fungus plant feeding upon the juices and tissues of the potato leaves, causes the characteristic black circular spots on the leaves. The prevalence of the disease is often controlled by such factors as weather conditions, soil fertility, and the natural vigour of the variety of potatoes.

Results of these spraying experiments indicate that marked increases in yields may be obtained from one application of the mixture late in the season, if the development of the disease is carefully observed. In Wisconsin early potato blight is usually most destructive between August 15 and September 25. The number and dates of application will depend upon the season, three thorough sprayings generally being needed between August 15 and September 25.

Spraying is generally better adapted to the standard late varieties. Substantial increases in yields have been obtained from spraying early varieties which were planted late. Success from spraying early varieties, which were planted early, is exceptional in this State.

Failures in spraying for blight are often the result of one or more of the following causes:—

Impoverished soil—Weakened potato seed—Injury from potato beetle—Carelessness and inattention to essential details.

The first three causes are especially noticed during a dry season. The more favourable the tillage conditions the larger the returns which may be expected from spraying.



BLACK-LEG OR POTATO STEM ROT.

(Caused by *Bacillus phytophthora*.)

1. Showing disease in different stages of development on haulms.
2. Diseased tuber, bacteria having entered through minute wound at *a*.

Failures in spraying for the potato beetle usually result from the fact that the poisons are not applied until the beetles have received a good start on the vines. Failures with poisons in this State, such as Paris Green and arsenate of lead, are usually due to mistakes in the method of applying rather than to any inferiority of the product.

In buying a spraying machine growers are cautioned against buying inferior machines or those that are not intended for the work required. Such machines are on the market.

The Department of Agriculture, Ireland, recommends the use of washing soda in preference to lime, for the following reasons:—“(1.) The spraying material adheres longer to the foliage of the plants and is not so readily washed off by rain. (2.) The mixture can be more easily prepared. (3.) The nozzles of the machine are not so liable to become stopped with grit or refuse material. If washing soda is used and the mixture is carefully made, there should be no sediment.

The mixture is made up in the following proportions:—2lbs. sulphate of copper of 98 per cent. purity; 2½lbs. washing soda of 98 per cent. purity; 10 gallons clean water; or, if a 40-gallon paraffin barrel of the mixture is to be prepared, four times the above quantities will be required. Dissolve the sulphate of copper in a separate vessel to that in which the washing-soda is dissolved. Pour the latter into the copper sulphate and stir continuously. The following test can be made:—Apply blue litmus paper to the solution, if it turns red more washing-soda must be dissolved and added in small quantities until fresh paper put in the solution remains blue. It is then fit for use as a fine spray.

As sulphate of copper dissolves slowly in cold water, it will be found better to use hot water first, afterwards adding the required amount of cold water. Each solution can be kept separate for several days; but when the mixture is made it should be used immediately, as it rapidly deteriorates. All vessels coming in contact with the sulphate of copper should be of wood and not of metal, and they must not be afterwards used for domestic purposes. The washing-soda solution should be poured into the sulphate of copper solution, and not conversely. Spraying is a prevention, it should be done before the disease shows itself; two or three sprayings at intervals after rain and with growth of new foliage will be advisable. Spraying should be carried out during dry weather.

For an average crop of potatoes with fully developed foliage, about 100 gallons of mixture per acre will suffice.”

All diseased plants should be carefully dug up and the haulms or stalks and tubers destroyed by burning or boiling, the remainder of the crop to be sprayed. Potatoes or tomatoes should not be planted on or near infected land for at least three years.

THE IMPORTATION OF POTATOES.

SPECIAL REGULATIONS.

A special *Government Gazette* issued on 7th inst. contains the following new regulations under “The Insect Pests Amendment Act, 1898,” relating to the importation of potatoes:—

1. Except as hereinafter provided, the importation of potatoes from the States of Queensland, South Australia, and Tasmania is absolutely prohibited:

Provided that the Minister for Agriculture may, from time to time, in his discretion, permit the importation of any consignment of potatoes from any of the said States subject to these regulations.

2. No potatoes shall be imported into Western Australia from the States of New South Wales or Victoria unless said potatoes are in new bags branded with a clear Government brand of the State where they were grown, and are accompanied by a Government certificate signed by an officer of the Department of Agriculture of such State certifying that such potatoes were grown 50 miles at least from any district known to have or to have had Irish potato blight, nor unless such potatoes were sent direct from the field to the ship. The signatures must be written, as block or stamp signatures will not be accepted, and each certificate must show the number of bags in writing. Any percentage of decomposed or diseased potatoes as may be determined from time to time by the Director of Agriculture or other officer shall condemn the whole consignment.

3. Any consignment of potatoes being, or having been in contact with a diseased or prohibited consignment of potatoes, may be destroyed, or disinfected, or otherwise treated as an Inspector under the said Act may direct.

4. All potatoes imported into Western Australia shall be subject to inspection at the port of entry by an Inspector under the said Act.

5. The importer or his agent shall within 24 hours after the arrival of the potatoes assist the Inspector in such inspection and disinfection, and for such purpose shall, if required, open and empty the bags or packages or remove the potatoes to any place or shed, and perform all labour incidental to or in connection with such inspection and disinfection.

6. The fees (payable in 24 hours and in advance) shall be as follows:— Inspection of imported potatoes, per hundredweight 1d., fraction of a hundredweight to be charged as a hundredweight.

7. If an Inspector under the Act declared any imported potatoes or the resultant crop thereof to be diseased or infected with disease, he shall require the importer or the owner to disinfect, destroy, reship, or otherwise dispose of such potatoes.

8. If the importer or his agent or owner fails or neglects to conform to these regulations or to carry out the requirements of the Inspector as aforesaid, the Inspector may destroy the potatoes or perform the work at the expense in all things of the importer or owner.

9. All bags or packages that have contained imported potatoes may be disinfected or destroyed or otherwise disposed of by the Inspector.

THE GREENING OF POTATOES.

The "greening" of potatoes intended for "seed," which is brought about by exposing the tubers to light for some weeks before planting until the skin assumes a dark green colour, is a practice that has been followed for many years, and is generally admitted to be productive of good results, although it is still too frequently neglected (writes George Massee, assistant-keeper, Royal Botanic Gardens, Kew, in the "Journal of the Board of Agriculture" (England). The opinion of growers who consistently follow this practice is that the haulm or "top" is much more sturdy and robust than when the seed is not "greened," and this, as would naturally be expected, results in a better crop. Certain experiments have been conducted at Kew for the purpose of ascertaining in what particular manner "greening" proves beneficial.

First Experiment.

Two batches, each consisting of 12 tubers of the variety called "Up-to-Date," and each batch having exactly the same weight, viz., 1lb. Soz., were placed singly on a shelf in a room, where they were exposed to a good light. The experiment commenced on 25th August, six days after the tubers were lifted. One batch was covered with opaque black paper, the other batch was left exposed to the light. The sprouts were constantly removed on their earliest appearance, and all the potatoes were turned over once a week. The experiment terminated on 25th March. On weighing, it was found that the batch that had been covered with black paper had lost exactly $3\frac{1}{2}$ oz. in weight, whereas the batch that had been exposed to light and had become thoroughly "greened," had lost barely three-quarters of an ounce. Water probably accounted for most of the loss of weight; respiration would also be responsible for some loss; and the presence of sugar (Trommer's test) indicated a certain amount of activity in connection with growth.

In the following experiments, the kind of potato, the weight, and the duration of time were identical with those mentioned in the first experiment.

Second Experiment.

Both batches of potatoes were covered with black paper during the first five months of the experiment. During this period a certain amount of sprouting took place, the sprouts of the two batches weighing $2\frac{3}{4}$ oz. At this stage the two batches, after the removal of the sprouts, were practically of equal weight. One batch was now covered with black paper, and the other batch left exposed to light, and in this condition they remained until the end of the experiment. The sprouts produced by the batch exposed to light averaged a quarter of an inch in length, and weighed a quarter of an ounce. The sprouts of the batch covered with paper averaged three inches in length, and weighed $1\frac{1}{4}$ oz. The batch of potatoes that had been covered with paper throughout the experiment weighed $1\frac{3}{4}$ oz. less than the batch that had been exposed to light during the last two months of the experiment.

Third Experiment.

At the commencement of the experiment one batch was covered with black paper and the other batch left exposed to light. This condition of things lasted for two months, when it was found that the covered batch lost 1oz. in weight, and the batch exposed to light had lost about 18 grains. From this stage both batches were covered with black paper, and remained so until the end of the experiment, when it was found that the batch that had been protected from light throughout the experiment had lost $3\frac{1}{2}$ oz. in weight, including the sprouts, whereas the batch that had been exposed to the light for the first two months of the experiment lost just over $\frac{3}{4}$ oz. including the sprouts.

The batch that had been protected from light throughout contained a considerable amount of sugar at the end of the experiment, and when cooked had the sweet taste and close texture characteristic of many potatoes in the spring, whereas the batch that had been thoroughly "greened" immediately after lifting was quite "floury" and normal.

Advantages of "Greening."

The time is now past when small potatoes, good enough for nothing else, were considered good enough for "seed." The general opinion held at the present day is that it is essential to have a good, firm tuber that has not been partly exhausted by loss of moisture and continued formation of sprouts that are broken off when the tuber is planted. As the above experiments indicate clearly, this result is better attained with "greened" seed than with seed not so treated. A potato not "greened" loses just over six times as much in weight during the season as a potato of equal weight that has been "greened." A potato that is "greened" in the spring loses twice as much in weight as a potato "greened" immediately after lifting in the autumn, other things being equal.

Effect of Light on Growth.

Under similar conditions of temperature, light much retards the growth of sprouting of a potato, whereas growth is greatly favoured by darkness. The explanation of this difference of behaviour in light and darkness respectively is as follows:—Before a potato can commence to sprout a certain amount of its starch must be converted into soluble sugar by means of a ferment or enzyme. Such enzyme can only be formed in a potato when there is a free interchange between gases formed in the interior of the potato and the atmospheric air.

An experiment proved that when the surface of a potato is coated with an impermeable varnish, except the "eyes," no sprouting takes place, even under the most favourable conditions for so doing.

The act of "greening" causes the skin or periderm of the tuber to become comparatively impervious to water and gases, hence the relative cessation of growth and loss of substance, whereas the periderm of a tuber kept constantly in darkness is not so impervious. The difference in amount of suberin present in the two cases is readily apparent on the application of tests for the presence of this substance.

The greatest amount of benefit derived from the "greening" of potatoes will be obtained when it is practised in the autumn after lifting.

In addition to the advantages indicated above, autumn greening will, to a great extent, check the ravages of winter rot, which often spreads in a wholesale manner after potatoes are stored, the fungus readily gaining admission through the soft skin of ungreened potatoes.

The stout, sturdy, firmly attached sprouts of greened potatoes do not break off during planting. The long, weak sprouts of potatoes kept in the dark have to be broken off before planting, as they are useless.

OUR WHEAT EXPORT TRADE.

IMPROVED HANDLING FACILITIES AT FREMANTLE.

Visitors to Victoria Quay, Fremantle, at any time during the past few weeks might have wondered at the scene of activity in the neighbourhood of storage sheds "H" and "I." Inquiry from any of the officials of the Harbour Trust would have elicited the information that all the bustle was due to preparations that are being made by the Harbour Trust Commissioners for dealing with the export of grain from the Port during the coming wheat season.

It is probably too early to arrive at any really reliable estimate of what the season's export will total, but the favourable climatic conditions that are being experienced throughout the whole of the agricultural area of the State and the increased acreage now under grain are strong evidences that the crop will be a heavy one and that the export this year will establish a record. As was chronicled some weeks ago the Harbour Trust Commissioners intended to make an early commencement on their plans for carrying out storing and shipping business, and the forward state of the work on the quay shows strongly their determination to grapple with the task ahead and complete it by the middle or end of next month, though the first of the wheat to be handled at Fremantle will probably not reach the Port until towards the end of December next.

The secretary to the Harbour Trust (Mr. F. Stevens) gives interesting data concerning the work in progress and the intentions of the Trust for dealing with the wheat export trade during the coming season. Sheds "H" and "I" are to be wholly devoted to storage of wheat for shipment, and in addition, probably sheds "A" and "B" and also portions of sheds "C," "F," and "G" will be used if the regular business of the Port will admit of it. Shed accommodation for at least 12,000 tons will certainly be available, and it is probable that the existing sheds can be made to take several hundreds of tons more. Twelve thousand tons, however, is the quantity for which the merchant buyers and shippers have intimated to the Trust Commissioners they will require shed accommodation at any one time. In addition to the sheds there will be open-air stacking room between several of the sheds on Victoria Quay, capable of taking several hundreds of tons, while the North Quay and the land at



PROGRESS OF SETTLEMENT.
A well-advanced farm in Wagin District.

the rear of same is, if necessary, available for stacking probably a further 20,000 tons, so that in all there should be stacking area available between shed and open air equal to between 30,000 and 40,000 tons of wheat. It is not at all likely that any such quantity as this will be stacked at the Port at any one time during the season, as, by the nature of the business, some shipments will probably have gone while quantities of the grain still remain in the country. It is evident, however, that if put to it, a very large quantity could be given storage room at the Port.

The works in hand at Victoria Quay consist of the laying of two lines of rails down the centre bay of sheds "H" and "I" and widening the quay between sheds "G," "H," and "I," and to the eastward of shed "I" to enable these lines of rails to be continuous throughout the two sheds. Turn-out lines are being put in between each two of the three sheds communicating with the lines on the face of the quay, in order to give the utmost facility for dealing with the waggons when relieved of their loads of wheat, and as required also for the feeding of the shed lines with loaded rakes. The design of these lines is such that an engine can back a rake of loaded waggons into the east end of shed "I" and push them right through into shed "H," and so set up the two sheds for work while the waggons as they are emptied may be sent out between the sheds, or pulled out the way they enter, as may be dictated by the work at the moment. As compared with the conditions obtaining last season, this innovation alone should be the means of enabling the work this year to be done very rapidly, and by quickly releasing the waggons from their loads, enable the fullest use to be made of the rolling stock for working the grain from the country to the Port. Last season the bags of wheat could not be got nearer the stacks than the lines of rails on the outside of the sheds, and the bags were carried on men's backs from the trucks to the stack—often upwards of a hundred feet, the men having to walk up the stack to deposit their bags. Such a method was slow and correspondingly costly, but this year the greatest length of "carry" for men will not exceed 35ft., and they will not be asked to walk up at all, the work being done on a level. This result will be achieved by means of mechanical hoists which are now being fitted in sheds "H" and "I," and which will work on the faces of the stacks immediately over the loaded waggons in the sheds, so that the heavy work of raising the bags will be done mechanically directly out of the trucks and the bags landed on the tops of stacks and carried the short distance necessary on the level and stacked. The hoists in the two sheds mentioned are of different character, though in principle they are very similar. The function of each type is to raise the wheat a single bag at a time from the truck to the top of the stack, but while in shed "H" each single lift will be worked independently by the men at the stacks, in shed "I" the lifts throughout the number of trucks being worked at one time will move simultaneously. Each type of hoist has its advantages and adherents, and in order to give each system a thorough working trial the Commissioners have installed both. The motive power in each case will be electricity, gained through the use of electric capstan motors, which up to the present have not proved successful on the wharf, owing to the exposed nature of the building, whereas in a weatherproof structure they will, it is stated, be capable of good work. The necessary capstan boxes containing the motors will be placed in the sheds intact and will, by a simple adaptation to the requirements, do the lifting of the bags and the hauling out of empty waggons. Two of the independent type of hoists are being mounted on a capstan box in such

a way that the whole contrivance with its motor and shafting will be entirely self-contained, and can be used in any position about the wharves for stacking purposes, whether inside a shed or in the open air as necessary. The open spaces between the sheds will also be capable of being stacked upon by the hoists installed in the sheds by the simple means of passing the wire hoisting ropes outside to any position the work demands. These appliances are cheap, and give promise of being thoroughly effective, possessing also an additional advantage in that at the conclusion of the wheat season the sheds are immediately available again for general business, and the hoists can if desired be used for handling general cargo. As all the appliances are made fast to the roof and roof supports, the entire floor space is left available for work.

Thus far the Harbour Trust Commissioners are going in their preparation for the practical business of handling the grain after it reaches their premises, but there is still much to be done by those interested in buying and shipping before complete success and satisfaction is assured. In order to bring the latter about the Commissioners inform the merchant buyers and shippers that they are prepared to handle their grain during the coming season on the following terms and conditions:—

Weighing, marking, etc.—All weighing which is required to be done on the premises of the Trust will be carried out by the Trust, as requested from time to time. Where desired also the weights will be marked on the bags. Where requested the Trust will supply a list or note of the weights, for record purposes, but this list or note of weights will in no sense constitute a receipt, nor be deemed as qualifying or embodying any condition of any receipt.

Receipts.—The Trust will give receipts for all bags received for storage purposes only on a special "*Fremantle Harbour Trust Wheat Receipt*" form only. Where requested the Trust will give a receipt for rejected bags on a "*Fremantle Harbour Trust Rejected Wheat Receipt*" form only.

Rejected Wheat.—As regards bags rejected at ship or shed, or other spot where handling is done, these will be allowed to remain on the premises of the Trust at the place where they are discharged, for the period of 48 hours, after which they will be loaded into railway waggons and sent to the railway yard at Fremantle, consigned to the merchants on whose account they were originally discharged, and at the entire risk and expense of the said merchants.

Open-air Stacks.—With regard to open-air stacks, the Trust will not cover the bags stored in the open air, but will, as requested, place over such stacks such coverings as the owners see fit to provide, without responsibility on the part of the Trust, and the charge for such service shall be the actual labour cost of the men employed to do this work. For dunnage, the Trust will, where requested, permit the use, free of rent, of any material which they may have on hand suitable for dunnage, but the merchant must pay all costs of collecting, laying, and returning such material.

Wheat Received from Coastal Ports by Water.—Where wheat is brought to the Port by water for export, and has to be landed before shipment, the same conditions and charges as are herein set out for wheat brought down by land will apply, and so long as the wheat is exported there will be no wharfage charges. Where such wheat is transhipped to the export vessel, overside direct vessel to vessel, and not landed, the Trust will not handle it, nor will there be any Harbour Trust charges upon it beyond the ordinary port dues on the vessels conveying it to and from the Port.

Responsibility.—In no circumstances will the Trust accept responsibility for weight, condition, value, or character of bags or contents, nor will it accept responsibility for loss or damage to bags or contents while on its premises by reason of the ravages of vermin, or from fire, or natural deterioration of bags or contents in the case of shed-stored bags, or for loss or damage to bags or contents from vermin, fire, robbery, natural deterioration, or weather in the case of open-air stored bags. In regard to all rejected bags, as these will be allowed to remain on the premises of the Trust for a limited time (as set out herein) for the convenience of owners, the Trust will accept no responsibility regarding them for shortage or damage of any sort, from any cause whatsoever.

North Quay.—In view of the possibility of a heavy tonnage of wheat coming forward to be dealt with, it is the intention to utilise the north side of the harbour for the work of shipping direct truck to ship, as far as is possible, and also probably for the forming of stacks. Merchants are requested to bear this in mind in making application for space, or in notifying the Trust of the particulars of the shipments they intend to make. Merchants should also bear in mind the possibility which always exists of the Trust having, owing to the pressure of business in the Port, to order a ship to the north side (or to another berth anywhere) to complete her loading, or to fix the north side for her loading throughout.

Loading of Waggons.—Merchants are requested in the interests of the work to use their best endeavours to secure careful loading of the waggons in the country by having the bottom tier of bags placed on end and the upper tier placed on their flats on top of those on their ends. It will also assist in checking the tallies, if the various types of waggons can be loaded always with a uniform number of bags.

Handling Charges.—The handling charges on wheat for shipment will be as follows:—

- (a.) Full service, *i.e.*, receiving and delivering, including stacking, where required, Trust giving a receipt for number of bags only, per bag, $1\frac{1}{2}$ d.
- (b.) For each or any additional or special handling service required, such as turning over or sorting bags for re-sampling, re-weighing, or otherwise, or stacking, trucking, etc., as requested, or as necessary, per bag, $\frac{3}{4}$ d.
- (c.) Slings bags from railway waggons under ship's slings, per bag, $\frac{3}{4}$ d.
- (d.) Conveying bags from one berth to any other berth, or from one shed to any other shed, all on south, or all on north side of harbour, per bag, 1d.
- (e.) Weighing and or marking of weights on bags, including a list of weights (but not a receipt for weights) for each time such service is performed, per bag, $\frac{1}{4}$ d.

On rejected wheat the charges will be on the following scale:—For each service performed such as handling from waggons, loading waggons, or other vehicles turning over or sorting, per bag, $\frac{3}{4}$ d.; weighing and or marking, same as (e.) above, per bag, $\frac{1}{4}$ d.; conveying from berth to berth or shed to shed, as in (d.) above, for each such service, per bag, 1d.

Work in Overtime Hours.—Where performance of any service causes the work to be done in or to extend into hours other than the regular working

hours of the Port, the particular charge laid down for such service will be increased by the additional amount payable to the men as overtime rate of pay.

Storage Charges.—The storage charges on wheat shipped will be as follows:—For shed storage but not to involve responsibility for damage by vermin, fire, or deterioration, per week, per bag, 1-6d.; for open-air storage space, but not to involve responsibility for damage by vermin, fire, robbery, deterioration or weather, per week, per bag, 1-12d.

In the case of wheat being stored on the premises of the Trust, ostensibly for shipment, but eventually not shipped, but taken away by the owners for other purposes, the storage charges will be the same as set out in Harbour Trust regulation No. 163 for ordinary general cargo.

In order to avoid a recurrence of the delays and confusion which so marred the success of the work last season, merchants are particularly urged to take advantage of the offer of the Commissioner of Railways to send straight through to the wharf sheds trucks of wheat as received from country stations, so long as he is provided with information as to what shed or berth the various trucks are to be sent to, and his requirements as to payment of charges for haulage, etc., are arranged to be met. In this connection the Commissioner of Railways and the Harbour Trust Commissioners offer to merchants special facilities whereby the reconsigning of waggons from the railway yards at Fremantle to the wharves can be almost, if not quite, obviated. In this way heavy charges for demurrage on waggons can be presented, and the best use made of the available railway rolling stock. In connection with the facility thus offered for obviating the delay which last year took place by the loaded waggons lying in the railway yard while the Harbour Trust officials were waiting for them on the wharves, it will be of the greatest possible assistance to all concerned if the utmost care is taken in the original consigning of the waggons at the up-country loading stations, and if merchants will arrange for this consigning to be not to "Fremantle" alone, but to the particular wharf shed, stacking spot, or shipping berth, as the case may be according as that particular grain is being dealt with at the moment, a great advantage will be gained by all concerned, as the waggons will then go direct to their ultimate point of discharge, be rapidly unloaded and released for further work, while the merchants themselves will be saved considerable worry and expense and the Harbour Trust will have a reasonable chance of doing their portion of the work expeditiously and satisfactorily. In respect to weighing and sampling, so long as this is done at the actual point of shipment confusion and delay must result, and the Trust Commissioners sincerely hope that merchants will take full advantage of the offers made by the Commissioner of Railways of stacking blocks at any station or siding throughout the producing areas where wheat can be received from the grower, sampled, weighed, and stacked there, and later on worked to the Port for actual shipment. In this connection the Commissioners will give every facility to merchants for forming nucleus stacks at the Port, from which a vessel can be loaded in conjunction with the grain arriving alongside in train-loads from the country stacks. In this way a vessel should get as rapid despatch as if the whole of her cargo was already stacked in her berth before work was started to load her, while the strain on the resources of the Port and the Railway Department are reduced to within a reasonable limit.

With the preparation thus being made by the Harbour Trust Commissioners and the Commissioner of Railways, and the co-operation of buyers

and shippers, it is hoped that the work will be as rapidly, cheaply, and creditably done at Fremantle next season as is the case in the Eastern States, where the work has developed along reasonable and well conducted lines, enabling large tonnages to be rapidly handled without hitch or confusion.

PRESERVING THE SOIL.

"Plant food must be in a liquid condition before it can be absorbed by the plant. To dissolve the food there must be a great deal of film water, the capacity of which is increased by fining the soil.

"There are little roots attached to the rootlets which are so small that the eye cannot discern them. These are called root hairs, and through them the plant receives its food. The root hairs of a root system collect nourishment from undissolved plant food by tending to dissolve it with an acid secreted in the membrane of the root hair.

"The (green) chlorophyll grains impart the colour to the leaf, but their main purpose is to absorb energy from the sun and use it in making the carbon dioxide which enters through the stomata of the leaf, and water from the soil into starch.

How Soil is Wasted.

"One way by which soil, or the fertility of the soil, is exhausted by the continuance of one certain crop from year to year. This is injurious because it exhausts the plant food which is available. Since exposure to the air oxidizes soil, one remedy for this would be to deeply stir the soil and expose it to the air. Oxidation makes soil more fertile by making unavailable foods available. Rotation of crops also remedies this.

"Another way in which the fertility of the soil is wasted is by erosion, such as washing away by rains and streams and shifting by winds. This can be remedied by planting a crop having matted roots so as to hold the soil together; by tilling so as to drain off the water; by plowing crosswise or diagonally across the drainage; by filling up ditches with rubbish; and planting trees in ditches so that the roots will keep the banks from caving in and washing away.

"As these fertilizers must be in a liquid state before the plant can use them, there must be a great deal of film water in the soil to be fertilised or the fertiliser will not pay. Hence the farmer must take care that there is a sufficient supply of humus in the soil.

Rotation of Crops.

"There are several reasons why a rotation of crops is necessary; namely, to prevent the exhaustion of some plant foods more than others; to provide plenty of humus; to provide bacteria for legumes; to keep the land in use; to distribute labour evenly throughout the year; to control weeds; to rid the land of insects and pests; to provide for 'ready money'; to get nitrogen from the air, and to break up the under-lying subsoil by deep roots."—Sentences as originally written by a pupil of Miss Lois Coffey, normal training school teacher of Macomb—Reported for Illinois Farmers' Institutes by Arthur J. Bill.

SALT FOR SHEEP.

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There exists in most farmers' minds a dimly conceived idea that salt is good for sheep, and so at irregular intervals they supply it to them in varying quantities; but probably few of them really understand the effect this condiment has upon the digestion, nor the actual need that exists for it.

It is not an accidental craving that causes sheep to so eagerly devour salt, but rather is it a real, physical want that demands satisfaction. Hydrochloric acid is one of the chief constituents of the gastric juices of the stomach that plays so active a part in digestion, and it is to help supply the chlorine of this acid that salt is necessary. It will be noticed that when sheep have not had salt for a long time they eat it in simply enormous quantities. This is because the supply of chlorine has become depleted, and requires replenishing. So it is not simply to lend variety or improve the flavour of food that salt should be given, but rather to supply chlorine for the gastric juices.

Another reason why salt is useful to sheep is because it increases their thirst, and causes them to drink water in sufficient quantities to carry on the normal functions of the body. If foods are eaten, and only a small amount of water drunk, impaction often occurs in the digestive tract, and trouble or loss ensues. Moreover, when the water supply is small, the assimilated food is not so readily carried to different parts of the body and distributed to the tissues.

Particularly when sheep are on grass and crops do they need salt, because these crops contain potassium salts. Potassium has a greater affinity for chlorine than hydrogen. Hence, unless plenty of chlorine is supplied to the body, the potassium takes a portion of that which otherwise would combine to form hydrochloric acid.

Either coarse ground or rock salt may be used for feeding, as preferred. There is probably more waste in connection with the ground salt, but licking the rock salt sometimes makes the sheep's mouths and tongues sore. If coarse salt is used, a tight trough, covered with a little roof, as a protection from the rain, should be provided.

The average ewe requires from three to five pounds of salt a year, the variation depending largely upon the amount of natural salts contained in the feed given. This would mean that she should have from two to three pounds during the summer. It would be well to weigh out the amount that the whole flock should have during the summer upon this basis, then there will be no danger of giving too little.

It is a mistake to give sheep salt only occasionally, and in large quantities, for under these conditions their appetites are so sharpened for it that they eat too much. If it is kept constantly before them, when they can eat it at will, they will eat what is necessary for the carrying on of bodily functions, and will not take too much at once.—*N.Z. Farmer.*

POULTRY NOTES.

(From *Farmers' Weekly*.)

HOW TO MAKE A NEST.

An English authority on poultry rearing gives the following description of the best kind of nest to arrange for sitting hens:—

The best way to make the nest is to scoop out a little earth from the ground, and then the earth in the hollow should be beaten down quite firm in the shape of the nest. Where no earth can be removed a few shovelfuls of soil should be obtained and moulded into the shape in an ordinary nest-box. It is easier to form the nest soil than with a turf, and the soil should be damp, beaten down well with the hand. If the soil is damp it forms a nice even surface and holds well together. The nest should be a quite round hollow, so that all the eggs are covered when the hen alters her position. The lowest point should of course, be in the centre, so that the eggs roll and keep together again when the hen steps into the nest. Plenty of room must be given, as when a bird is cramped in sitting a good many of the eggs are likely to get broken.

The hollow should be lined with fine hay at the bottom of the nest in very cold weather, but before this is put in a handful of slack lime should be sprinkled into the nest, as this prevents vermin from breeding there. Hay is much better than straw, as it keeps closer together, and thenceforth holds warmth better, and where this is used the hens may be allowed more eggs. Straw is hollow, and so conducts the cold air to the eggs, especially in frosty weather.

Nest-boxes should be made considerably larger than is generally allowed, as it is important that a good depth and width should be allowed for, as only when a good amount of earth is put in is sufficient moisture applied where-with to damp the eggs. The heat from the hen's body draws it upwards as the inner membrane of the egg is softened by this moisture, consequently if there is not sufficient the dry tough membrane holds the chicks prisoners, and many are thus lost.

Where a nest is large, this is, of course, avoided, as there is a much better supply of moisture. The nest-box should never be less than 15 inches or 18 inches square. A board of 6 inches to 7 inches wide should be put in front of the nest, so that the damp soil, when thrown in, should be a little higher than this board. The soil should be beaten into shape with the hand, which should be protected with a glove, so that nothing that is in the soil may injure the hand. Some people have a piece of wood, about 3 inches or 4 inches square, to beat the soil with, but the hand shapes the earth better. The nest should be perfectly round, and the centre should be the lowest point of the hollow, so that all the eggs should roll towards the centre.

After the nest is shaped it can easily be beaten out a little wider at the top if more eggs are set. A hen will cover fifteen eggs in the coldest weather,

sometimes twenty-one, but it is better to be on the safe side, and if valuable eggs are set twelve in a sitting, if put into a well-made nest, will hatch for all they are worth, as few addled eggs are found if this is done.

A little freshly-slaked lime should be put round the top of the nest and in the middle, so that when the nest is lined with fine meadow hay this lime comes under the hay and kills any vermin that may accumulate. It is very necessary that the hay be interwoven and put together layer over layer, so that it is nice and smooth.

The hen turns her eggs twice in each twenty-four hours, and when the nest is properly made the eggs turn quite easily, and do not roll one on the other. When the hen is sitting her wings rest on the side of the nest and her feet go to the bottom, and this is why the comfort of the hen should be studied.

TO FEED CHICKENS.

The first food which many breeders give their chickens consists of infertile eggs, boiled hard and chopped fine, and occasionally this is done with fair success when the eggs had been boiled for half an hour and mixed with twice their bulk of stale bread. Hard-boiled eggs are not easily digested, however, and I decline to eat them myself, or to feed them to young chickens (writes a poultry authority). As chicken feed, they are a frequent cause of bowel troubles, resulting in a complication of ailments, and frequently death.

For the first feed, he prefers to give breadcumbs mixed with scalded milk, or corn meal mixed with milk. Cornmeal mixed with twice its bulk of coarse pollard, moistened with milk and mixed into a crumbling mass, is very good, given when warm—although it can be given when cold as well. Coarsely ground cornmeal can also be given in small quantities. Scatter this on a board, or in a shallow tin. Young chicks are very fond of this, and will eat a considerable quantity of it.

After the chicks are ten days old, a little cracked wheat can be given them, and from this time on cracked corn should be constantly supplied to them. The objection to feeding so much corn in any of its forms to adult fowls does not exist in the same extent in the case of growing chickens, as it tends to accelerate their growth and promote their health, without making them too fat.

Animal food and green food are just as important for chickens as for adult fowls, and the same kinds are equally good for both, but as a rule the younger the chickens the more watchfulness is necessary in feeding them.

Charcoal is a very valuable assistant in rearing chickens, although seldom if ever mentioned in poultry publications. It is of vital importance, as it assists digestion and hence corrects or prevents a multitude of evils. It need not be completely pulverised, but should be broken up to about the size of wheat and given to the chickens in shallow pans. This simple suggestion should not be forgotten.

THE EGG-LAYING COMPETITION, SUBIACO.

Commenced May 1, 1909. To close April 30, 1910.

Following are the results up to August 31:—

The figures in black indicate the winners of the monthly prizes.

The first column of figures indicates the present position of the pens in the competition.

		FOWLS.					Price	
Owner.	Breed.	May.	June.	July.	Aug.	Total.	per	Setting.
1 M. Love	White Leghorn ..	90	112	129	140	471		
2 A. W. Green	White Leghorn ..	109	98	124	128	459		
3 D. Mildren (S.A.) ..	White Leghorn ..	106	102	128	116	452		
4 C. B. Bertelsmier (S.A.) ..	White Leghorn ..	90	113	104	123	430		
5 A. L. Ballantyne	White Leghorn ..	66	107	123	128	424		
6 E. E. Ranford	Black Orpington ..	76	118	99	126	419	10/6*	
7 Lionhurst P.F.	White Leghorn ..	85	94	106	126	411		
8 Craig Bros.	Black Orpington ..	67	119	104	118	408		
9 Gwalia Pen	White Leghorn ..	93	92	91	131	407		
10 Mrs. S. Dixon	White Leghorn ..	106	67	91	127	391		
11 J. E. Pryke	White Leghorn ..	93	82	87	125	387		
12 South Perth P.F.	White Leghorn ..	89	71	109	117	386		
13 F. Whitfield	White Leghorn ..	75	76	113	112	376		
14 W. H. Wright	White Leghorn ..	58	77	114	123	372		
15 Mrs. A. Robinson (No. 1) ..	White Leghorn ..	107	51	76	135	369		
16 Sunnyside Egg Farm (S.A.) ..	White Leghorn ..	107	79	77	104	367		
17 Mrs. M. Kynaston	White Leghorn ..	98	63	91	115	367		
18 Caesar and Geddes	White Leghorn ..	105	51	96	114	366		
19 Greenville P.F.	Silver Wyandotte ..	112	41	97	104	354		
20 Bert. O'Shannassy	White Leghorn ..	79	67	102	105	353		
21 R. L. Martin	White Leghorn ..	94	36	112	111	353		
22 E. E. Ranford	Minorca	40	83	113	113	349	10/6*	
23 Mrs. A. E. Kinnear (S.A.) ..	White Leghorn ..	66	59	95	129	349		
24 Mrs. A. Robinson (No. 2) ..	White Leghorn ..	80	57	82	128	347		
25 Jack R. Parkes No. 1	White Leghorn ..	75	43	99	127	344		
26 Mrs. L. Mellen	White Leghorn ..	91	42	104	105	342		
27 J. Faulkner	White Leghorn ..	75	64	74	121	334		
28 Stephen Craig	White Leghorn ..	46	57	100	126	329		
29 Jack R. Parkes No. 2	White Leghorn ..	65	62	84	114	325		
30 Sunflower P.F.	White Leghorn ..	53	52	103	115	323		
31 S. W. Stewart	White Leghorn ..	67	43	104	101	315		
32 Greenville P.F.	White Leghorn ..	47	83	50	118	298		
33 A. H. Padman (S.A.)	White Leghorn ..	83	15	79	121	298		
34 Austin and Thomas	White Leghorn ..	45	57	78	104	284		
35 Belmont P.F.	White Leghorn ..	38	58	78	103	277		
36 Stafford Bros.	White Leghorn ..	58	15	88	108	269		
37 C. W. Johnson	White Leghorn ..	36	23	92	112	263		
38 E. E. Ranford	Brown Leghorn ..	29	50	82	101	262	12/6*	
39 White Wings P.F.	Black Orpington ..	7	27	105	121	260		
40 Mrs. E. Douglas	Black Orpington ..	31	52	69	105	257		
41 Wilson and Caesar	White Leghorn ..	51	51	60	89	251		
42 F. S. Squires	White Leghorn ..	20	26	78	121	247		
43 C. L. Braddock	White Leghorn ..	28	47	64	101	240		
44 Carlowrie P.Y.	Brown Leghorn ..	12	38	85	104	239		
45 H. Hunter	Plymouth Rock ..	46	34	62	77	219		
46 J. Faulkner	Golden Wyandotte ..	16	27	72	93	208		
47 White Wings P.F.	White Leghorn ..	33	4	57	113	207		
48 Mrs. E. Small	British Game ..	15	11	24	54	104		
		3,158	2,896	4,354	5,452			

Winner of first monthly prize, Greenville P.F., Silver Wyandottes, 112; second month, Craig Bros., Black Orpingtons, 119; third month, M. Love, White Leghorns, 129 eggs; fourth month, M. Love, White Leghorns, 140 eggs.

* Advt. Owners of pens can have price per setting placed in this column for one shilling per insertion.

DUCKS.

	Owner.	Breed.	May.	June.	July.	Aug.	Total.
1	P. Lyons	Indian Runner ..	159	164	175	151	649
2	G. Thomson	Indian Runner ..	106	155	162	143	566
3	D. Vincent	Indian Runner ..	47	156	176	174	553
4	H. Carr	Indian Runner ..	93	113	169	170	545
5	Simplex Incubator Factory ..	White Indian Runner ..	114	148	111	109	482
6	P. O'Connor	Indian Runner ..	9	119	177	162	467
7	South Perth P.F.	Indian Runner ..	43	134	130	133	440
8	Carlowrie P.Y.	Indian Runner ..	59	111	113	127	410
9	White Wings P.F.	Buff Orpington ..	103	86	90	114	393
10	Rowenhurst Pen	Indian Runner ..	3	44	163	164	374
11	A. Pratt	Indian Runner ..	60	23	109	170	362
12	Greenville P.F.	Pekin	2	36	139	181	358
13	Mrs. Ginder	Rouen	14	48	120	149	331
14	White Wings P.F.	Indian Runner ..	52	5	106	160	323
15	C. W. Johnson	Indian Runner ..	87	56	51	75	269
16	Greenville P.F.	Indian Runner ..	24	32	69	139	264
17	F. Whitfield	Indian Runner ..	5	31	105	133	243
18	J. T. Johns	Indian Runner ..	30	45	54	84	213
19	Jack R. Parkes (No. 2) ..	Indian Runner ..	29	25	34	130	188
20	Jack R. Parkes (No. 1) ..	Indian Runner ..	14	0	3	154	171
21	Mrs. E. Small	Pekin	1	0	11	155	167
22	Mrs. L. Mellen	Indian Runner ..	0	0	26	132	158
23	Mrs. Ginder	Aylesbury	0	2	11	138	151
24	K. Becker	Indian Runner ..	4	1	0	75	80
			1,658	1,534	2,304	3,292	

Winner of first monthly prize, P. Lyons, Indian Runner, 159; second month, P. Lyons, 164; third month, P. O'Connor, Indian Runner, 177; fourth month, Greenville P.Y., Pekin, 181 eggs.

THE COTTON INDUSTRY.

We learn that in addition to the cotton grown in the Moreton districts, a large quantity is being sent to the mill from Central Queensland, where a large number are engaged in the industry, being thoroughly satisfied with the returns they get from it. Some of these are from America, having grown cotton in the United States before coming to Queensland, and it is a significant fact that they are sending for their friends and recommending others to come and take up cotton growing here. We are pleased to learn that Messrs. Joyce Bros. of the Ipswich cotton mills, were awarded a silver medal for their fine exhibit, which is thoroughly deserved. A feature of the trophy, which our readers who are interested in fruit growing will not have failed to have noticed, is a number of fruit trees shown covered with "Joycennette," a material now being manufactured at the Ipswich Cotton Mills. This not only ensures clean fruit by keeping out the fruit fly, but also shields the fruit from the frost, and by softening the rays of the sun, enables it to ripen very gradually, and with a finer flavour than is the case where the trees are not protected.—*Australian Producer*.

PRACTICAL PIG-RAISING.

(*New Zealand Stock and Station Journal.*)

Some very interesting accounts of practical methods of breeding and fattening pigs have lately appeared in the "Australasian," which will specially appeal to pig-breeders in this country, where the conditions are in many ways very similar to what they are in Victoria. Mr. F. Wimpole, of Heidelberg, who fattens some 200 pigs every year, and has done so for a number of years, and has, therefore, a long practical experience with pigs, says :—I breed pedigreed Berkshires and pedigreed Yorkshires, and for market purposes frequently cross a purebred Berkshire sow with a purebred Yorkshire boar. The result is always white pigs. I am strongly in favour of using pure sows as well as pure boars. If a breeder should use crossbred sows (cross between Yorkshire and Berkshire), I would recommend using a pure Yorkshire boar in preference to a Berkshire boar for the Yorkshire boar, the suckers are white, whereas with a Berkshire boar the result is a motley crowd, and a pig of Berkshire or Yorkshire type sells better than a spotted one.

The following are results I have obtained from mating a Berkshire boar with three crossbred sows:—

Sow.	No. in Litter.	No. of White Pigs.	No. Typical of Berkshire.	No. Spotted.
Sow No. 1	6	3	3	—
Sow No. 2	9	4	3	2
Sow No. 3	10	4	3	3

Personally I object to spotted pigs. My last year's sales showed slightly in favour of the white pigs.

I have found that I get the largest and strongest litters by keeping the gilts away from the boar until they are over 10 months old. Young sows should be in good condition at farrowing time, but not fat. The boar should be at least 10 months old. I like him older.

I am satisfied if my sows average eight at a litter, and rear them all. I never wean the young pigs before they are eight weeks old.

Hard and Soft Feeding.

The methods of feeding pigs for pork and bacon may be classed under two general headings—hard feeding and soft feeding. Hard-fed pigs are those that are fed on the produce of a mixed farm (grain, root crops, skimmed milk, etc.); soft-fed pigs, those that are fed on the refuse of restaurants, etc., and which do not get sufficient grain. I favour and practise hard-feeding, as it produces pork of higher quality than that of soft-feeding. When made into bacon the hard-fed pig, to say nothing of quality, is far more economical for the consumer, as there is not the loss in weight when cooked as there is with soft-fed bacon.

I feed mostly on barley (ground or steamed), pollard, peas, potatoes, mangels, sugar beet, and separated milk. The quantity of grain given to each pig varies from 1lb. to 6lb., according to the weight of the pig. All grains are suitable for pig-feeding, but they should be either ground or

soaked. For finishing off I prefer barley or peas when feeding for pork and bacon. I sty the young pigs when they are about 60lb. live weight, keeping them growing all the time, never letting them become stores, and have them prime at four to five months for pork and about nine months for bacon. I find they make the best bacon about that age, the lean and fat being nicely mixed, and not breaking from one another when cooked as it does when store pigs are bought and quickly fattened. To successfully fatten pigs, they require, besides food, that their sties be clean, warm, and dry, and that their digestive organs be kept in good order. Pigs are subject when kept in sties to get lice on them. These must be got rid of, as they use up much food by sucking the pig's blood. Crude oil, I believe, is about the best to rub on the pig. With regard to the stud pigs, I let them graze as much as possible in paddocks specially cultivated for them. Young pigs require to be over 50lb. live weight before they get the full advantage from grazing. It is difficult to fatten pigs on pasture alone. They require a small amount of grain as well.

I try to work the sows so that they have three litters in two years. By doing this I find my sows are always in good health, and prove good mothers for many years. It is well to keep your sows as long as they are profitable. I market my bacon pigs at about 210lb. live weight, which turns out finished sides of bacon, weighing about 58lb. Pork pigs I market from 90lb. to 100lb. live weight.

Sties and Shelter-sheds.

I use sties and shelter-sheds. The sides of the sties are built of wood, with shutters, to open back and front to let the sun in. The roofs are iron, and the floors brick and cement. I have 60 sties, and they vary from 12ft. to 27ft. long and from 6ft. to 9ft. wide. It is wise to have some large sties in which to house the breeding herd when the weather is bad.

For winter I have false floors, made of wood, to place in the sleeping compartments. This is very essential, as a brick and cement floor is too cold and damp during the winter.

In the grazing paddocks, where the brood sows run, are the shelter-sheds. They are built in on three sides, being open on the side facing the east. The roof is of iron, but there are no artificial floors in these sheds. I find that the earth makes a warm and dry bed, and the pigs keep it dry and pulverised. It is very unwise to use straw for bedding in these sheds, as it is apt to form a mulch.

As I only use the milk separated on the farm, and have the cows under the inspection of an expert, I do not sterilise the milk, for it is better to feed the pigs on unsterilised wholesome milk.

Mr. P. J. Devine, of Yarragon, another breeder, writes:—The Berkshire is an all-round breed, equally good for raising pork or bacon pigs. But the Berkshire sow, when very pure bred, is liable to have small litters, and often does not take good care of what she has. I have some half-bred Tamworth sows which I put to a pure bred Berkshire boar. The result has been very good so far as bacon pigs are concerned. But I cannot get good porkers from this cross. They are light bacon before I can get them prime fat. The crossbred Tamworth sow is a really good mother; she has large litters, and takes great care of her young. She is a good milker, and a good "doer." I have some half-bred Yorkshire sows, which are very good, and when put to

a Berkshire boar will breed good pork or bacon pigs. In fact, I find the pure bred Yorkshire sow the best for raising porkers or bacon pigs. As a mother she is equal in every way to the crossbred Tamworth, and you can get her pigs ready for market sooner. I always use a purebred Berkshire boar. I am so satisfied with the Yorkshire sows that I intend to keep no others. By this cross I hope to improve the constitution of my pigs. Breeders of purebred pigs often breed too close. Crossing the two distinct breeds will counteract some of the ill effects of in-breeding. Some people advocate crossing the breeds the other way; that is, the Yorkshire boar to the Berkshire sow. No doubt that is the easiest way, and you will raise the same class of pig for the market; but you lose all the advantages which the Yorkshire mother would give you, namely, large litters and small losses. With pure Berkshire sows you will have small litters and rather large losses.

Another well-known pig breeder writes:—The best breed to use will vary according to requirements. To breed porkers, use a pure Yorkshire boar and Berkshire sows, not necessarily pure bred. To breed baconers use a pure Berkshire boar and crossbred Tamworth and Berkshire sows. There is no more prolific or better mother than a crossbred Tamworth-Berkshire sow.

The litter should be from 8 to 12, nothing less. Wean at 8 to 10 weeks old, according to what is required of the sow.

Provide plenty of food for fattening. Small feeds, from four to six times per day, is the best method. Assuming the basis of the food is skim-milk, then add a little pollard and grain at each meal, but not in large quantities. If doubtful as to how the pigs are thriving, do not hesitate to give a good dose of Epsom salts. Breeding sows and store pigs do not require more than a good grass paddock, but if their condition is low a few sugar beet will be the cheapest method of improving them.

Pigs may be marketed at any time up to 90lb. weight. After that weight they must be kept till they reach 120lb. Above the latter weight they will bring so much per lb. less, according to the weight attained.

In respect to housing, observe conditions which will keep all rain and draughts away, and at the same time let in light and air. Floors, whether of wood or brick, must be perfectly watertight. If brick, a wooden covering must be provided, with plenty of straw for sleeping purposes, as a warm bed is essential. If neither brick nor cement floors are used, build the sleeping portion of sty 3ft. from ground, and slope the feeding-pen to the ground, making sure the floor is put tight together to avoid draughts and drainage getting through.

Sterilised milk should be mixed with meal (at least one bushel to 50 gallons of milk), and raised to a temperature of 100 degrees at least, once a day, so as to cause fermentation.

Berkshire, Yorkshire, and Tamworth are all good breeds to use for breeding purposes, but the strongest and healthiest pigs will be raised from crosses. Always use a pure boar. The breeding sows must not be kept fat, as they do not breed so well, and are clumsy with their litters. Keep the boar in good condition but not fat. Give the sow salts after farrowing. Always have a patch of sugar beets as a stand-by, as it is the best root to grow, and sows with litters must always have plenty of feed.

SOIL MOISTURE.

(By H. R. HILTON, in *Kansas Farmer*.)

All decaying vegetable matter plowed under adds to the mechanical improvement and water-holding power of the soil. The quickest returns are obtained from the green vegetation, the most lasting from the dry, whether leguminous or non-leguminous. The latter, if not thoroughly placed in the soil to insure decay, are liable to dry out the soil. The mechanic who can devise a machine that will cheaply convert an old straw stack into a meal like alfalfa meal, to be sown broadcast and plowed under, will be a public benefactor by supplying to the soil a mechanical improver standing second only to a good manure pile. In the form of meal the straw will help the mechanical condition of the soil from the start and not hinder in the first year as it would if plowed under as uncut straw.

Capillary Water from Subsoil.

Emphasis has been laid on the danger of turning under stubble or trash that would lie between the subsoil and the furrow slice preventing the contact that would restore the capillary connection destroyed by the plow. But capillarity is not going to lift much water from the subsoil into the freshly plowed surface soil however good the contact until the rain has first wet through the cultivated soil to the subsoil. When the disc has been used as a subsurface packer to fill the cavities and compact the subsurface immediately after the plowing, and this has in turn been followed by the drag or pulverizer and these by the harrow, then the soil is in condition to receive the rain. The weight of the stirred soil aided by the water percolating through will in a short time re-establish the connection between surface and subsoil so that film water can pass freely in either direction as tension may direct.

Capillary Rise.

Many readers of farm papers need to have their minds disabused of the idea that water is constantly rising from the subsoil into the surface soil by the force of capillary attraction. It will do this if the subsoil is fully saturated or there is a ground water level within one to three feet of the surface or in land where this water level has to be lowered by drainage. The percentage of such instances is small. In over 95 per cent. of the cultivated land of the United States the water level is too far below to ever reach the surface by capillarity. It is surface tension or the movement that takes place between the thicker and thinner films within a limited area that is the great agency of transportation between the subsoil and the surface soil, or *vice versa*. Film water moves more freely up and down than it does laterally, probably because the weight of the soil keeps the soil grains in closer contact vertically. As a soil containing clay loses its moisture, it contracts in bulk causing vertical cracks or fissures that interfere with the lateral spread of water. The circuit is broken. It is only while the soil is near half saturation or the films are thickest that

movement for more than a foot or two laterally is secured. In one sub-irrigated garden, in which a small stream was kept running through the pipes part of every day, the water spread sixteen feet from the pipe line underneath the surface mulch. If the water had been applied only once in two or three weeks the lateral movement would have been but two or three feet so long as the sub-soil could absorb the surplus. The movement of film water through the soil is a slow one in any direction under the most favourable conditions, except where gravity can assist, but it moves fastest when the films are nearest the maximum thickness. As the film grows thinner and clings tighter to its host, the soil grain, its movement becomes slower.

When the rain wets a dry soil down six inches its tendency to spread down further is very slight. As the depth of wetting increases, the influence of gravity increases, and when a dry soil is wet down 18 inches, and the rain has stopped, the water may spread downward to two feet from the surface before its downward progress is arrested or before surface tension can overcome the force of gravity and the weight of the longer column.

Puddling the Surface.

When the surface soil is made fine and dusty, a heavy shower converts it into a mud blanket. If the rain drops are large they strike into this mud with considerable force, increasing the puddled effect. This is one of the problems that every farmer has to deal with. It is one reason why the harrow should follow the roller and why a roller should not be used for the finishing work. The rain is needed and wanted, but the puddled surface is to be avoided. Does not common sense dictate that a roughened not a smooth surface should be presented to the falling rain drop? That clods and trash should intervene to break its force and lessen the puddling effect? A roughened surface also aids in maintaining the loosely compacted surface soil secured by so much labour to insure the most favourable soil conditions for high water content, sufficient air, active bacterial life and plant growth.

The Root System.

In the early spring, the fine fibrous roots of the growing plants are most abundant just underneath the dry top soil where it is warmest, but by the month of June, they fill the entire area as deep as the land has been plowed and in the warmest months crowd the bottom of this tilled area. Where the soil is finest without being impervious there the roots are most numerous, because there the plant roots find most water and most food. This emphasises the importance of getting the fine soil at the base of the root zone and the coarse material on the surface to form the crown of our dry earth mulch. In more southerly latitudes a soil gradually deepened to 10 inches and enriched with humus will have its water supply better protected against surface evaporation than would be possible with a six inch depth of plowing. If Southern Kansas needs a three-inch dry earth mulch to protect the moisture supply, that would leave only three inches of feeding area for the roots in the six-inch plowing, as against seven inches in the ten-inch plowing. Doubling the depth doubtless the work, but it almost doubles the farm acreage.

Another reason for leaving the surface rough is that the rain will find so many more crevices or openings where it can break through the resisting dry earth mulch to a connection with the moist soil underneath, thus drawing

the water away more rapidly from the surface, lessening the tendency to puddle and the danger of drying out crusty.

Tillage Tools.

No tool has yet been devised that equals the plow in breaking up and jarring apart the compacted soil particles in preparation for plant life, but it has its problems. Deep plowing may leave the subsurface badly honey-combed and hard to reach afterwards with pulverizing tools. The disc or cut-away should precede the plow to prepare several inches of loosened soil that can be turned into the bottom of the furrow, reducing cavities to the minimum. A good discing following the plowing secures a good mixing of clay and silt and sand. The round disc is preferable where stubble, weeds or manure are turned under, as it presses equally at all points. A cutaway is preferable in clean ground as it brings more coarse material to the surface, and sifts more fine material below. The spike tooth harrow with tooth slanting back pulverizes and firms the soil for the seed, but just before seeding should be used once with teeth slanting forward to work the clods, stones, etc., to the surface, and sift the fine soil below.

Any tool or tools that will firm the soil recently plowed, sift the fine soil down where the roots should grow and bring the rough material to the surface for protection against puddling, are desirable. The roller, or plank drag can do good work before the final harrowing, but should rarely follow the harrow or press drill that covers the seed. The exception would be sandy soils or newly turned sod.

Every one who farms sandy soil tries to get it as compact as possible to increase its water-holding power. On the clay soil, the aim is to keep it just loose enough that air and water can circulate freely. Decaying vegetable matter is one of the most valuable mechanical aids in securing the results aimed at in both these soils.

Lime.

Besides its value as a medicine in curing soil acidity and its chemical aids in the preparation of plant foods, lime is a valuable agent in granulating compact clays that the water and air may circulate with greater freedom. Put some fine clay in two milk bottles filled with water. Shake the bottles to show a muddy or cloudy appearance. Add a little lime water to one, and note how much sooner the clay particles will settle to the bottom leaving the water clear. The action of the lime assembles the clay particles into little masses like the curdling of milk, and these gaining weight soon settle to the bottom. The lime in the soil acts similarly to assemble a number of soil particles into one mass which the water films surround as if it were a single soil grain. Lime makes a clay soil look and act like a loam soil.

The Mechanical Work of Roots.

A pointed fence post driven into the ground forces the surrounding soil grains into a very close arrangement that holds the post firmly in place. The growing roots are doing a similar work in the soil. Root hairs are microscopic in size, and how can they absorb the water and food in solution if not brought in contact with very fine soil particles? The larger corn roots exert a pressure that surrounds them with a more compact formation of the soil for an eighth to a quarter of an inch from their surface. The fibrous roots bring an appreciable pressure on the surrounding soil, and on the newest growth of these

are the root hairs that project into this compressed jacket insuring a better contact with the film water on the surfaces of these soil grains.

The compression by the roots increases not only the water holding but the surface tension power of the soil around the roots so long as there is continuous film water to draw from. Thus does nature provide a way that the plant can work out its own salvation. Prof. F. H. King estimates that the roots of a vigorous corn plant all laid end to end would equal a mile in length. With roots permeating every cubic inch of the tilled soil that contains moisture, we can readily understand what a force is at work in the soil to concentrate the water of the soil on its root system. We can also understand why the evaporation of water from the surface is so small three days after a good wetting when we think of these myriads of intercepting root hairs sucking water from the films nearest them and starting a movement of the soil water from the thicker films towards these root hairs.

Cause and Effect.

A dairyman gets an amount of milk from five cows in a pasture that gives them all they can eat and no more. He gets no more milk by doubling the number of cows in the same pasture and he may get less. A farmer may get a one-pound ear from each stalk of corn that is given four square feet of surface and has enough food and moisture at all times to properly nourish it. Doubling the stand and dividing the food and water of one plant between two so that no one plant has quite enough may bring the average ear far below half a pound. It is as important to know the available food supply and water capacity of a certain field and gauge the thickness of seeding thereby as it is to know how many head of cattle a certain pasture will properly care for. A perfectly developed plant gives promise of a more profitable return than can be possible from a partially developed one. The critical period in the life of each plant and the time when it needs most abundant water supply is from the time the bloom begins to set until the seed is well formed.

A short water supply during this period will mean defective nourishment and a greatly reduced yield of grain.

Each corn plant in the field is a pump, and the larger the leaf surface on each stalk the greater the capacity to pump water from the soil into the air. In southerly latitudes the corn plant has a tendency to develop a larger leaf surface, and unless thinly planted is liable to exhaust the soil water before the seed is perfected. This is one reason why it is so important to plant varieties that develop the largest or best filled ears in proportion to the thickness of stem and size of the leaf.

Rainfall not used.

The normal rainfall for Eastern Kansas during the five growing months, April to August inclusive, is 18 inches. There is almost invariably four inches of available water on the soil at the end of the winter. It is possible to save and utilise one-half of the summer rainfall from evaporation, run off and drainage for the use of growing crops. This would be nine inches added to four inches already stored in the soil, making 13 inches of water available in each average year. On the basis of the Wisconsin formula of 300 pounds of water to one pound of dry matter, in corn this 13 inches should produce 70 bushels of corn per acre on the average soil in fair state of fertility. As the average production of Kansas does not exceed 30 bushels, it is evident that

not much more than six inches or one-third of the growing season's rainfall is being utilised and that a doubling of the corn production is possible through this one agency alone, of saving from waste what is possible to save of our annual rainfalls.

The deeply plowed, well pulverized, root filled, dry topped humus soil, will give to the growing crop 13 inches of water each season, and this crop will give to the farmer 70 bushels of well filled ears.

There are many wastes and leaks on a large percentage of our farms, but none greater than the wastes of available soil moisture.

Co-operation and Harmony.

The great laws of nature are co-operation and harmony. The soil must have all the essential food elements, and these in harmonious proportions that the plants may grow. The four great master workmen, water, air, heat, and light must co-operate and work in harmony that the plant may thrive. It is the mission of every tiller of the ground to give to the soil its opportunity to nourish the plant, and to give to each and all of the four workmen their opportunity to take the seed and the nourishment and from these build up the perfect plant that will ripen its grain in due season.

THE MEAT INDUSTRY AND AGRICULTURE.

By LOUDON M. DOUGLAS.

Lecturer on the Meat Industry, College of Agriculture, Edinburgh.

The Agricultural Education Association of the United Kingdom, which is composed of all the Professors and Teachers of Agriculture and cognate subjects, held its annual conference at Bristol recently, and there was a large muster of well-known authorities present. The papers read were of varied character, some of them being devoted to original research, whereas others dealt with organisation and other matters. One of the most interesting of these was the following, by Mr. Loudon M. Douglas, of Edinburgh:—

The meat industry is essentially a department of agriculture, and it seems to me to be a curious thing that this fact should not have been recognised long ago. It is also significant that, so far as I am aware, this is the first occasion on which the subject has been introduced at a meeting of this kind. I feel that there is no apology needed for this departure from the beaten track, as I hope to show that the absence of opportunities of discussing this matter has proved highly detrimental to education on the subject. I need hardly point out how intimate is the connection between the meat industry and agriculture, but it may be said that the ultimate aim of introducing fat stock is for the use of the meat industry, and, as a matter of fact, a large portion of the live stock on the farm has ultimately to pass through the hands of the meat purveyors. In so far as



A fine herd: Pastoral scene in Western Australia.

The production of live stock

is concerned, there are ample opportunities for students acquiring a knowledge of the principles which govern that department of the subject. In every one of the 22 Colleges which are devoted to giving agricultural education, the curriculum is designed purely and solely for the benefit of agriculturists, and if you take any of the calendars of these Colleges to which I have referred, you will look in vain for the indication of any course of instruction which would attract the members of the meat industry. It may be contended, however, that this is not considered necessary, and, in fact, that agricultural education should stop at the production of live stock, and that the rest should take care of itself. Will you allow me to point out that there are no other educational institutes in the United Kingdom at which meat purveyors could receive technical instruction except at the Agricultural Colleges, and I hope to show that it would be a mutual advantage if such courses were provided.

In the first place, there are computed to be some

45,000 *master meat purveyors*

in the United Kingdom, and it is a fair calculation to say that each will employ at least four hands, thus the number of skilled men required to conduct the trade in the United Kingdom may be taken at 180,000. If you again multiply the original figure by four, as representing the average families, you will see that the number of people dependent on the industry is very large indeed, and may be approximately stated at 360,000 people. The meat industry in this country represents an

Annual turnover of nearly 50,000,000 cwt.

and in this gigantic figure is represented many different products which require technical skill in the making. It will be understood also that under the Public Health Acts the meat purveyor must possess the technical skill to enable him to distinguish the evidence of disease in live stock and in dead meat, and, should he be unfortunate enough to be found with any diseased meat on his premises, he is liable to very heavy penalties. But there is no opportunity for the meat purveyor to acquire education on the subject of either the handling of the technical by-products of his industry or the diseases of animals. He requires to be somewhat of a veterinarian, and is penalised if he is not, but there are no means by which he may obtain this technical knowledge. I think all rightly constituted people will be prepared, therefore, to admit that, in the interests of the community, this should be altered, and that meat purveyors should have opportunities of acquiring education on:—

1. Diseases of Animals.
2. Bacteriology.
3. General Principles which Govern the Handling of Meats and their Conversion into Subsidiary Products.

These subjects are necessary to every meat purveyor, but they should also be supplemented by a knowledge of chemistry, agricultural zoology, and the principles of breeding.

Bacteriology and pickles.

With regard to bacteriology, it may be specially stated that a knowledge of this subject would enable the ordinary meat purveyor to appreciate the

value of pure pickles. This may appear to be a small matter, but it is not really so, because at least 80 per cent. of the total number of meat purveyors of the United Kingdom use pickles for the pickling of meats, and in the majority of cases these are constructed in the most haphazard rule of thumb way. The conditions under which the pickling is carried on are in many cases far from being hygienic, and in samples of pickle which I have examined I have found that they have been teeming with micro-organisms of all kinds. In many cases the meat is put into the pickle when it is in a partial state of decay, and I need hardly point out that in such a condition, even if ultimately cured, it is very likely to give rise to dangerous ptomaines. Hence it is that we have records which show cases of ptomaine poisoning in England from June, 1907, to November, 1908, numbering altogether 822, and arising out of which were 73 deaths. These are only casual cases collected from the newspapers, but I think we are entitled to infer that there are many hundreds of mild cases which are never reported, and which are, to a large extent, attributable to meat which has been imperfectly cured. I only give this as an instance of what an immense amount of good would be done by proper instruction on the principles which govern this matter, and I may say that I have found meat purveyors very susceptible to such instruction. I conducted a class, numbering about 150 students, at the College of Agriculture, Edinburgh, during last winter, and have been astonished at the constant sustained interest which was evident from the beginning to the end of the course. I think, therefore, that I am justified in saying that, notwithstanding anything that may be said to the contrary, the meat purveyors are willing to take advantage of instruction when they get the opportunity. The general principles which govern

The handling of meat

and its conversion into subsidiary products, opens up a wide field of instruction which has so far only been available through text books, but there is no systematised course of instruction in this subject to be had at any of our colleges. As showing its vastness, I might indicate for example that

The products from a bullock

are something like over 100 in number, including, besides the well-known constituent portions of the carcase, such auxiliary products as hoofs, oleo, glue, different portions of the hair, grease, tongue, blood, intestinal offal, and many others; besides such as are converted into fertiliser. Nearly all of these products are, more or less, of a highly technical character, and would involve a special knowledge on the part of the teacher or lecturer, who would give instruction concerning them.

Qualifying certificate for meat purveyor.

The proper handling of meat is an art in itself, as is the manufacture of sausages and every-day products of that kind, and I contend that to fully appreciate these it is necessary that the meat purveyor should have a technical education. I would go further than that, and say that no one should be permitted to practice the meat industry without having a certificate qualifying him for that particular profession.

In so far as organising education along these lines is concerned, I think you will allow that it has been shown that there is at least a case for close

enquiry. There can be no better method of offering such technical education than through our agricultural colleges, seeing that the subject itself is part and parcel of agriculture, and that the manufacture of the various products from the carcasses of animals, is only the natural development of the higher branches of agriculture.

Suggested instruction courses.

On an occasion like this it is only possible to introduce the subject, and to throw out one or two hints as to how it may be dealt with in the future. I would, therefore, suggest that it would be possible to organise in our Agricultural Colleges courses of instruction for our meat purveyors which should include:—

1. Animal Breeding.
2. Veterinary Practice.
3. Chemistry.
4. Bacteriology.
5. Agricultural Zoology.

These subjects, it seems to me, are essential to the modern meat purveyor, and are indispensable to any one who would follow the manufacture of the finer animal products. On these lines, it would be possible to establish either a degree or a diploma in connection with the meat industry, and I feel assured that if this were done, it would meet with the hearty co-operation of the more enlightened members of that industry. To sum up, therefore, I would state the case as follows:—

- 1st.—The meat industry is an important branch of agriculture.
- 2nd.—There is no organised system of education in connection with the meat industry at present, except what exists at the College of Agriculture, Edinburgh.
- 3rd.—It is essential that the modern meat purveyor should understand the *technique* of his subject, so as to detect disease, and also to enable him to make the most of the by-products and auxiliary products which he meets with in the course of his business.
- 4th.—In order to become efficient the meat purveyor should have opportunities of regular study on animal breeding, veterinary practice, chemistry, bacteriology, and agricultural zoology.
- 5th.—The existing Agricultural Colleges are well adapted for carrying this proposition into effect.
- 6th.—The organisation of education in this particular department of agriculture should be on the lines of studying subjects which should qualify either for a diploma or a degree.

I would, therefore, invite the co-operation of the Agricultural Education Association in this matter, and I feel sure that if the members will think it over, they will see that the considerations at stake are very great, and, indeed, that the institution of a regular course of instruction in connection with the meat industry ultimately means the proper regulation of our principal food supply.

A PRACTICAL PIGGERY.

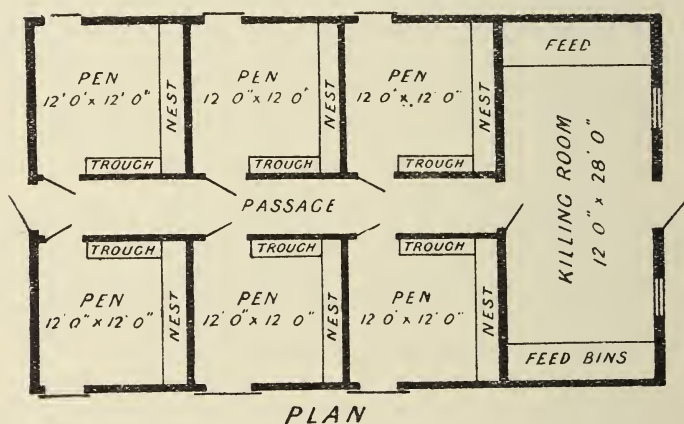
The most approved piggery should have an alley through the centre with pens on both sides, with gates placed conveniently to change the pigs from one pen to another as wanted.

A pig pen should be about twelve feet square, with an elevated nest in one corner or along one side.

The only way to keep a piggery clean is to have the floor of cement, with incline enough so that it may be scraped with a hand scraper and washed with a hose.

A piggery can be made convenient for feeding by having a feed room in one end, and close to the killing-room.

To keep a pig house dry and clean it must be well up from the ground. The plan accompanying these suggestions, made in the *Farm Press*, provides for a wall four feet high above ground, and the space between the walls is filled in with earth topped with cinders, and the cement laid on the cinders.

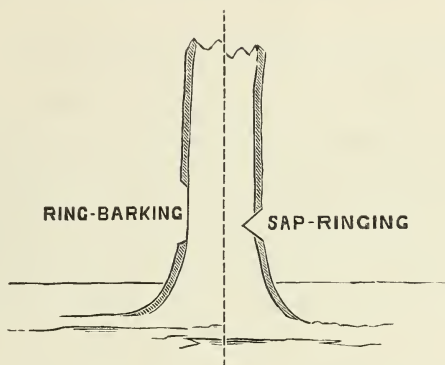


The expense depends upon the supply of sand and gravel or broken stone to make the wall and the cement floor. The wall may be carried up to the eaves or the building itself may be made of wood. This will depend on the supplies of material at hand. A cement house is always to be preferred, provided that you can get the materials to make it without running into too much expense.

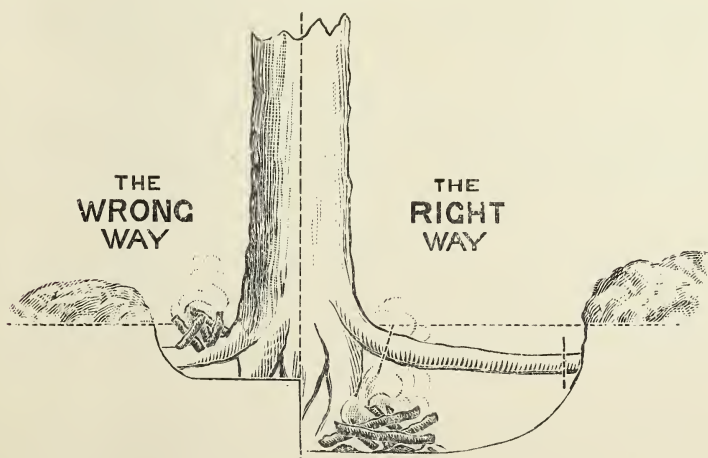
Ventilation is a matter of great importance, and there should be windows in the roof.

BEST TIME TO RINGBARK.

A correspondent writing in the *Sydney Daily Telegraph* as to the best time to ringbark timber says that his experience is that it varies a good deal with different varieties. He has come to the following conclusions:—That the sap in a tree rises about nine months in the year and is about three months coming down, before making a start up again; that there are only two months



in the year to ringbark a tree to get a proper kill, roots, stumps, as well as tops, that is, when the sap is fully up, and the tree is ripening its seed; that there should also be a close season from felling trees. To get good timber that will season well and last, trees should only be felled about three months in the year—when the sap is down and commencing to rise. Different kinds of trees ripen their seeds at different times of the year, and this should be the guide as to when to ringbark.



BURNING STUMPS.

(Vide Despeissis' "Horticulture and Viticulture," page 33).

GOVERNMENT LABOUR BUREAU.

AUGUST REPORT.

Mr. J. Longmore, Superintendent of the Government Labour Bureau, reports as follows on the operations for August:—

Perth.

Registrations.—The total number of men who called during the month in search of work was 720. Of this number 487 were new registrations and 233 renewals—*i.e.*, men who called who had their names registered during the month of July. The trades or occupations of the 720 applicants were as follows:—Labourers, 256; farm hands, 63; handy lads, 52; handy men, 43; carpenters, 31; cooks, 29; gardeners, 16; engine-drivers, 14; grooms, 13; hotel hands, miners, and painters, 11 of each; bushmen, 10; clerks, 9; blacksmiths, 7; shearers, 7; bakers, fitters, and horse-drivers, 6 of each; and 119 miscellaneous.

Engagements.—The engagements for the month totalled 293. The classification of work found was as follows:—Bushmen, 61; labourers, 49; farm hands, 33; handy men, 17; handy lads, 15; orchard hands, 15; woodcutters, 12; lads for farms, 11; sawmill hands, 11; cooks, 7; survey hands, 1; miners, shearers, and yardmen, 5 of each; carpenters, grooms, and hotel hands, 4 of each; and 28 miscellaneous.

Fremantle.

Registrations.—During the month the applicants for work were 32, classified as follows:—Labourers, 19; blacksmiths, carpenters, and engine drivers, 2 of each; and 7 miscellaneous.

Engagements.—The engagements for the month numbered 6, *viz.*, labourers, 4; and shearers, 2.

Northam.

Registrations.—The registrations numbered 7. The classification was:—Clearers, 5; and farm hands, 2.

Engagements.—There were 6 engagements, *viz.*, clearers 5, and one farm hand.

Kalgoorlie.

Registrations.—There were 52 new registrations and 19 renewals; total 71. The classification was:—Miners, 19; handy men, 18; labourers, 18; fitters, 5; blacksmiths, 3; and 8 miscellaneous.

Engagements.—The engagements for the month were 37, classified as follows:—Miners, 28; labourers, 5; handy men, 2; fitters and clerks, 1 of each.

The female servants who called numbered 17. There were 10 new registrations and 7 renewals. The classification was as follows:—Generals, 4; waitresses, 3; housemaids, 3; housekeepers, cooks, and useful girls, 2 of each; and 1 charwoman. There were no engagements.

Women's Branch, Perth.

Registrations.—The new registrations for the month were 123 and the renewals 43; total 166. The classification was:—Generals, 33; housemaids, 32; laundress-charwomen, 26; housekeepers, 18; cooks, 16; light generals, 13; useful girls, 9; nurse-needlewomen, 6; and 13 miscellaneous.

Engagements.—There were 70 engagements, classified as follows:—Laundress-charwomen, 37; generals, 12; light generals, 9; useful girls, 6; cook-laundress, 2; and 4 miscellaneous.

General Remarks.

The number of individual men who called at the Central Office, Perth, during the month in search of work was 720. This total is 135 short of that for August last year. The engagements for the month were 293. Of this number 255 were for private persons, which is 54 in excess of that for August, 1908. Government work accounted for the employment of 38 men. During the month there were 102 men assisted by railway passes from the Central Office, Perth. The fares refunded totalled £65 5s. 7d., and the sum of £14 5s. 3d. was received from employers for payment of fares to send workers, the whole amounting to £79 10s. 10d.

DATES OF AGRICULTURAL SHOWS.

The undermentioned dates have, under the constitution of affiliation, been fixed by the Royal Agricultural Society of Western Australia as governing body for the various agricultural shows during the year 1909:—

Irwin, September 29.
 York, October 5 and 6.
 Greenough, October 6.
 Beverley, October 8.
 Pingelly, October 12.
 Toodyay, October 13.
 Geraldton, October 13 and 14.
 Narrogin, October 14.
 Wagin, October 19.
 Katanning (National), October 21, 22.
 Moora, October 22.
 Kelmseott, October 25.
 Williams, October 26.
 Swan, October 27.
 Murray, October 30.
 Perth, Royal, November 2-6.
 Kojonup, November 10.
 Cannington, November 15.
 Bridgetown, November 25.
 Bunbury, January 12, 13.

GARDEN NOTES FOR OCTOBER.

By PERCY G. WICKEN.

Last month should have seen a large quantity of garden stuff sown, as seeds sown last month are enabled to obtain sufficient foothold of the ground before the weather becomes too warm. Only in the more Southern districts, where moist land is available all the year round, can much be done in the way of planting vegetables at the present time. The principal work in the garden this month will be keeping the ground free from weeds, the soil well stirred, and insect pests in check.

All kinds of plants may be put out in the open, and if it is not possible to plant out in showery weather, they must be shaded from the sun until they become firmly established, when the shade may be removed. This should be done on a cloudy day, as the hot sun striking on the delicate plant will probably wilt them so that they will not recover. All weeds should be cut down before the seeds have an opportunity of ripening, as by this means their spread is prevented. Many weeds will ripen their seeds after being cut down if the seed heads are allowed to form before cutting.

In a small garden the weeding must be done by a hand hoe, but where a large area is under cultivation the work can be carried out by means of the Planet Junior horse hoe.

Cut worms will most likely be troublesome, and they are capable of doing great damage. They generally hide in the ground round the stem of the plant during the daytime, and at night eat round the stem of the plant, which then breaks off or wilts away. By disturbing the ground round the stem of the plants these grubs can generally be found.

The best remedy is to lay a small quantity of bait, composed of Paris Green, mixed with a little bran, round where the grubs are troublesome, they will eat this and it will poison them. Care must be taken that fowls or other domestic animals do not get at this bait, as it is an arsenical poison, and will poison them.

As a general rule all fungus diseases of plants should be sprayed with Bordeaux mixture, and all leaf or stem-eating insects with Paris green and water, but this should not be applied for some weeks before the vegetables are fit to send to market.

Any backward plants may be stimulated into more active growth by the application of liquid manure, in the proportion of 1oz. of sulphate of ammonia dissolved in one gallon of water, or, in the case of a field crop a top dressing of sulphate of ammonia applied broadcast along the rows at the rate of 1 cwt. per acre and hoed into the soil will have an almost immediate effect.

Artichokes (Jerusalem).—May still be sown this month, although those sown earlier will probably yield best. The tubers should be cut into pieces the same as potatoes and planted in rows 3 feet apart, and 18 inches in the drills.

Arrowroot.—A few bulbs of the *Canna Edulis* may be planted out this month, the plant is both ornamental and useful, as a large supply of bulbs can be obtained for pig feed.

Beans.—French, kidney, scarlet runners, haricot, snake beans, wax beans, butter beans, etc., may all be planted out in large quantities this month where the ground is moist. Beans can be grown in the coastal districts nearly all the year round. The main crops should be planted in September or early in October. Plant in rows three feet apart, and manure well with superphosphate and sulphate of potash, and cultivate well so as to keep the ground moist.

Beans, Lima.—Should be sown in large quantities during the month, as they are an excellent bean for table use. There are many varieties, some climbers and others dwarf varieties. The climbing varieties require a trellis or poles to grow on, as they are prolific growers. The dwarf varieties should be planted 3 feet apart each way, and the climbing varieties about 4 feet.

Beet (Red).—Sow a few rows to keep up a supply.

Beet (Silver).—Is valuable for the supply of green leaves during the dry weather. Plant out any young seedlings you have ready. A little seed may be sown.

Cabbage.—Plant out any healthy plants you may have on hand, and top-dress any plants not doing well with liquid manure.

Carrot.—A few rows may be planted to keep up a supply. Weed the rows, and thin out plants from the rows already up.

Celery.—Plant out all forward plants in trenches, and hill up those making growth so as to cause them to bleach.

Cucumbers.—Seed may be planted in all parts. The hills should be worked deeply, and well rotted stable manure should be mixed with the soil. Plant about eight seeds in each hill, and thin out when plants come up.

Egg Plants.—Plant out all young plants, and sow a little more seed.

Leeks.—A little seed may be sown.

Lettuce.—Plant out any young plants available, and a little more seed may be sown.

Melons.—All kinds of melons may be sown this month. The holes should be deeply worked, as the roots penetrate deeply into the soil. The land between the hills should be ploughed or well scarified before the vines begin to run. Any very long runners should be pinched off, as this will often cause the fruit to set.

Onions.—In moist localities a further supply of seedlings can be planted out. Those already up should be kept free from weeds, and the surface soil should not be allowed to cake.

Parsnips.—A few rows may be sown to keep up a supply.

Peas.—In moist localities a few rows may be sown.

Potatoes.—If not already sown, potatoes should be planted at once. They will only be successful in moist localities if sown at the present time.

Pumpkins and Squashes can be planted out largely this month, but the ground should be deeply worked. This is a very profitable crop to grow, as the pumpkins can be stored and kept until required for use. Plant in hills about 12ft. apart each way.

Sweet Potatoes.—There should now be available for planting out plenty of shoots from the tubers sown in beds last month. As soon as the shoots are three inches above the ground, the tubers should be lifted and the shoots broken off and planted out in rows three feet apart and about 18 inches apart in the rows.

Tomatoes.—In the northern districts the early-sown plants should be ripening their fruit. The early fruit always fetches a good price, and the

object of the grower should be to produce ripe tomatoes as early as possible in the season. In all parts of the State seedlings may be planted out in the open this month; as many plants as possible should be put out, as there is always a demand for this vegetable. As the plants begin to make a good growth they should be tied up to stakes so as to keep the fruit off the ground. A little seed may be sown in moist localities for planting out later on.

Tumeric.—A useful plant used for flavouring soups, etc. Grows somewhat similar in appearance to ginger. Pieces of the root may be planted in the same manner as potatoes.

Farm.—In the extreme eastern farming areas the hay harvest will commence early this month, but in most of the wheat-growing areas it will be somewhat later, according as to how the season turns out. Reapers and binders should be looked to and put in order to commence work whenever required, and duplicate parts obtained to replace any breakages. When cutting for hay, it is a good plan to cut a strip round all the paddocks to be kept for grain, and plough up this strip. It will then act as a fire-break, and may possibly save the crop from destruction should a fire break out in the vicinity.

The agricultural societies will be holding their annual shows during October and November, and it is the duty of all farmers to support their local society by exhibiting any stock or produce that they have that is likely to be creditable to the district. Apart from the money distributed as prizes, a good agricultural show does much to advertise a district, as it brings before those interested the capabilities of the soil in the locality, and thereby induces settlement.

As the grass becomes dry the York Road poison plant sends out green shoots, and it is at this time that it is so dangerous to stock. A sharp lookout should be kept in paddocks likely to be infected, and any plants that can be found should be grubbed out.

In the cooler and moister districts such crops as 90-day maize, melons, pumpkins, sorghum, cow peas, soy beans, mangels, sugar beets, and pearl millet may be sown in well-prepared soil. They should all be sown in drills so that the cultivator may be kept going between the drills.

As dealers are now canvassing the country districts to secure orders for fertilisers for next season, settlers should bear in mind the fact that the Fertiliser and Feeding Stuff Act is now in force. This Act makes it compulsory on all vendors or fertilisers to register their brands and the contents thereof with the Department of Agriculture in Perth.

Before purchasing any fertiliser, one should ascertain whether it is a registered brand, and in the case of vendors trying to sell an unregistered brand, should report the fact to the Department of Agriculture, so that steps may be taken in the matter.

In addition to registering the brand of the fertiliser the vendor has to supply an invoice certificate stating the percentage of nitrogen, potash, and phosphoric acid contained in the fertiliser, and samples of the fertiliser are taken from time to time by the Inspector of Fertilisers, to see that they are up to the registered standard.

MARKET REPORTS.

GENERAL SUMMARY.

FARM PRODUCE.

In the Metropolitan Produce Market chaff has shown fairly good movement this month, though many lots have been more or less damaged with little demand. Prices have averaged as follows:—

Chaff.—Medium good quality, £3 17s. 6d., £3 15s., £3 10s., and £3 7s. 6d. Damaged, £2 5s. to £2 15s.

Wheat.—Business slight; sales reported at 4s. 8½d.

LIVE STOCK.

Good yardings at country centres and fair prices reported, with brisk bidding.

Sheep.—Good lambs, 14s. 8d., 13s. 9d.; others, 11s. 7d. to 9s. 5d. Fat sheep, 17s. 4d., 16s. 10d.

Horses.—Medium draughts, £35 to £40; useful farm sorts, £10 to £25.

Pigs.—Porkers, 30s. to 32s.; slips, 15s. 6d.

Cattle.—Fat, £7; store bullocks, £3 17s. 6d., £4 5s.; cows, £4 5s.; heifers, £3 5s.; springers, £5. Bullocks, £8 10s. to £9 17s. 6d.

METROPOLITAN PRODUCE MARKETS.

Citrus fruits are in heavy supply. Generally there is a steady market. Prices as follows:—

Fruit.—Apples: Rokewoods, 8s. 9d. to 12s. 9d. for flats, 13s. to 15s. for dumps; Cleopatras, 7s. to 10s. 3d.; Yates, 9s.; Stone Pippins, 7s. 6d. to 8s. 3d.; Jonathans, 7s. to 10s.; Dunn's Seedlings, 8s. to 10s. 9d. Pears: Le Inconnue, 7s. 3d. to 8s. 9d.; Vicars, 12s. Lemons, 4s. 3d. to 9s. 9d. Oranges: Navels, 12s. to 14s. 9d.; St. Michael's, Siletta, Valencia lates, 9s. to 12s. 6d.; some inferior lines, 6s. 3d. to 8s. 6d. Mandarins, 10s. 9d. to 13s. 6d. Loquats, 5s. 6d. to 10s. 6d.; inferior lots, 1s. 3d. to 3s. 6d. Cape Gooseberries, 3d. to 3½d.

Vegetables.—Cabbage, 1s. 6d. to 4s. 3d.; Savoy, 2s. 6d. to 5s. 6d.; red, 2s. 3d. to 4s. Asparagus, 10d. to 1s. Potatoes, 10s. 3d. to 15s. 3d. Swedes, 2s. 9d. to 4s. 3d. Parsnips, 11d. to 1s. 10d. Carrots, 6d. to 11d. Beetroot, 5d. to 9d. Turnips, 4d. to 8d. Rhubarb, ¾d. to 1¾d. Celery, 3d. to 4s. 11d. Lettuce, 3d. to 2s. 2d. Peas, 1½d. to 3d. Broad beans, 1¾d. to 2d. Onions, 9s. 6d. Cauliflowers, 9d. to 7s. 3d.

Butter, 1s. 2½d.

KALGOORLIE PRODUCE MARKET.

Moderate supplies of fruit to hand with a good demand. Vegetables are plentiful, especially swedes and pumpkins. Warm weather in transit seemed to have a bad effect on green vegetables, thus causing indifferent values. The following prices were secured:—

Fruit.—Apples: Yates, 14s. to 16s. 6d.; Romes, 13s. to 15s. 6d.; Dunn's, 11s. to 13s.; Rokewoods, 14s. to 17s.; Cleopatra, 11s. to 12s. 6d.; Sturmers, 9s. to 11s.; Oranges, ordinary, 9s. to 13s., prime to 16s.; Navels, 11s. to 15s.;

prime to 18s.; Mandarins, 16s. to 19s.; Lemons, scarce, 12s.; Loquats, 15s. 6d.; Cape gooseberries, 4¾d. to 6d.; Passion fruit, 23s. to 24s. 6d.

Vegetables.—Cabbage, 2s. to 9s.; Cauliflowers, 1s. 6d. to 5s. 6d.; Carrots, 9d. to 1s. 5d.; Parsnips, 2s. 10d. to 3s. 2d.; Turnips, 4d. to 1s.; Beet, 9d. to 1s. 6d.; Swedes, plentiful, 4s. to 6s. 6d.; Pumpkins, 8s. to 10s.; Celery, to 5s. 6d.; Peas, 3d. to 5d.; Rhubarb, 1d. to 2d.; Salads, 4d. to 1s. 6d.

Poultry.—Turkey gobblers, 15s. to 20s.; hens, 13s.; Fowls, 5s. to 6s. 3d.; Ducks, 7s. 6d.; Eggs, 1s. 1d. to 1s. 2½d.

ADELAIDE MARKET.

Adelaide, September 14.

Wheat continues to rule firm, and there are buyers at 4s. 6d., at which price, however, holders will not part, and business is as restricted as ever. There was no alteration in other cereals. Butter was unaltered, from 9½d. to 11d. for tops. Eggs brought to 8½d.

MELBOURNE MARKET.

Melbourne, September 14.

Wheat, 4s. 6d. to 4s. 7d.; flour, £10 15s.; bran, 10½d.; pollard, 1s.; oats, 1s. 7d. to 1s. 10d.; maize, 3s. 5½d. to 3s. 6d.; chaff, £2 7s. 6d. to £3 5s.; potatoes, £2 15s. to £4 10s.; onions, £6 10s. to £7.

LONDON WOOL SALES.

London, September 14.

For the forthcoming series of colonial wool sales 125,500 bales have arrived, and of these 47,500 have been forwarded direct to consumers, leaving (with 15,000 bales carried forward from the last series) 93,000 bales available for competition.

STOCK TRADE.

Dalgety & Company, Limited, in their September report on the trade in this State, report as follows:—

“We are pleased to be able to advise splendid rains in the southern portions of the State. The outlook is now most promising for both pastoralists and farmers, as the whole of Western Australia has had its full share of late. The only pastoral district that had been short of rain was Carnarvon, and, fortunately, this locality has lately been well favoured.

Fat Sheep.—Practically no alteration can be advised in the market, and best woolly wethers are still making 5½d. delivered Fremantle, killing for average. A fall on this price from this out seems likely to take place, on account of the large number of fats that will shortly be forced on the market.

Store Sheep.—Very few large station lines of stores have been sold for delivery after shearing, as vendors are asking from 10s. to 11s. for young ewes, from 10s. to 12s. for fat wethers, and from 8s. to 9s. for mixed lines of ewes and hoggets. Aged ewes are not in much demand, and can be purchased at about 6s. Of course, in the southern farming districts, prices are far in advance of those quoted above, and ewes with lambs at foot have of late been sold up to 22s. 6d., young dry ewes 17s. 6d. to 18s., best store wethers from 15s. to 16s., and hoggets from 11s. to 14s.

Fat Cattle.—The Kimberley regions are still supplying our requirements and the cattle coming forward are of good quality. No alteration can be

quoted in price, and 3½d. can be named as the ruling rate for bullocks, killing for average. The price quoted is for tops, and various grades are sold at less prices."

FROZEN MEAT TRADE.

In their September report Messrs. Dalgety & Co. state:—

Referring to the resolutions approved by the Chamber of Commerce in Sydney, having for their object adequate arrangements in carrying, shipping, and insuring frozen meat, some pertinent remarks were made recently by a leading Adelaide exporter. Although he considered many of the faults that exist in the Eastern State are not found here, still it is necessary to be on the alert and keep our methods up-to-date. The producers have not much to complain of, still there is no doubt the supply of sheep vans is barely sufficient for the demand during times of glut, such as when the grass seeds are threatening, and it is imperative to get the lambs away from the pastures.

What, however, is a matter of real urgency is the absence of proper insulated trucks for the carriage of frozen carcases from the Adelaide works to Port Adelaide and the new Outer Harbour, and from the Government Freezing Depot at Port Adelaide to the Outer Harbour. Sydney shippers are fully alert to the necessity of having insulated trucks to ensure the best condition of carcases before they are shipped, and the Adelaide arrangements should not be behind these. The South Australian Government has taken a great interest in making the Outer Harbour a success, and it is therefore the more necessary that suitable trucks should be provided. The use of netted slings for putting meat on board is also capable of improvement, where shutes are not available, and the advantages of trays or canvas slings are well worth testing.

PRICE OF WOOL.

(From Dalgety & Co's. September report.)

To colonial woolgrowers the paramount question is the price of the raw material, and this will ever remain the Alpha and Omega of their business. To-day's range of values is fairly high for merinos, super 60's tops at 2s. 2d. being considered above a normal price. There is no disguising the fact that there is to-day an under-current of expectancy that when pressing wants have been relieved we shall see fine wools slightly lower, for if to-day's values remain intact it will require an all-round thirty millions of money to lift the next Australian clip. The most experienced members of the trade say that that this is impossible, and that before the end of next November we shall see merinos and fine crossbreds lower than they are to-day. Such prophecies seem to me to savour too much of the wish being father to the thought, and there is time for a good deal to happen between now and then. At the same time we might as well face the facts as not, and so far as Yorkshire importers are concerned, there is a pretty unanimous opinion that we shall see a gradual ease between now and the commencement of the importing season. Nobody is looking for a slump, but 40's tops at 1s. and supers at even 26d. is a leeway that is a little too much to last. However, when the holiday season gets over it is just possible we may see larger orders placed for the manufactured article than what some anticipate, and if that obtains the price of the raw material will not suffer much. Manufacturing conditions in America are very good, and some pretty big talk is being indulged in that more wool will be imported next season. However, taking things all round, everything points to a fairly high range of values obtaining next season, and no grower will be acting wisely who does not accept straight off the good prices which are certain to be bid.

Rainfall for the month of August, 1909, recorded at telegraphic stations in Western Australia, and averages.

Published by Authority under the direction of H. A. Hunt, Commonwealth Meteorologist.

STATIONS.	*Total for August, 1909, in points.	No. of wet days.	Average for August.	No. of Years Records.	STATIONS.	*Total for August, 1909, in points.	No. of wet days.	Average for August.	No. of Years Records.
TROPICS :					NORTH COOLGARDIE				
Wyndham ...	37	1	Nil	22	FIELDS :				
Turkey Creek ...	29	3	7	11	Sandstone ...	249	9	...	...
Hall's Creek ...	33	2	1	18	Wiluna ...	116	5	44	10
Fitzroy Crossing	Nil	...	Nil	15	Mt. Sir Samuel ...	153	4	64	8
Derby ...	Nil	...	13	23	Lawlers ...	154	6	65	12
Broome ...	Nil	...	5	19	Mt. Leonora ...	189	9	74	11
La Grange Bay...	Nil	...	6	18	Mt. Malcolm ...	182	9	64	11
Wallal ...	Nil	...	11	12	Mt. Morgans ...	186	9	54	9
Condon ...	Nil	...	23	19	Laverton ...	205	9	54	9
Bamboo Creek ...	3	1	36	11	Murrin Murrin...	235	9	59	10
Marble Bar ...	34	1	29	14	Yundamindera	266	11	85	8
Warrawoona ...	23	1	46	9	Kookynie ...	217	10	106	7
Nullagine ...	3	1	50	11	Niagara ...	229	10	81	12
Port Hedland ...	Nil	...	51	11	Menzies ...	251	9	82	12
Whim Creek ...	14	2	50	11	Mulline ...	186	11	128	7
Roebourne ...	3	2	23	22					
Cossack ...	80	2	41	27	COOLGARDIE GOLD-				
Fortescue ...	Nil	...	28	21	FIELDS :				
Onslow ...	10	1	46	23	Davyhurst ...	260	14	114	7
Winning Pool ...	30	1	59	11	Goongarrie ...	194	11	78	13
					Broad Arrow ...	231	14	92	11
WEST COASTAL :					Kurnalpi ...	193	12	99	12
Carnarvon ...	192	12	64	26	Kanowna ...	160	13	107	13
Sharks Bay ...	303	15	81	15	Bulung ...	300	14	104	12
Wooramel ...	237	13	75	10	Kalgoorlie ...	255	12	99	13
Hamelin Pool ...	260	14	78	23	Coolgardie ...	182	13	95	16
Northampton ...	888	15	361	27	Burbanks ...	150	14	97	10
Mullewa ...	935	13	157	13	Widgemooltha ...	263	18	116	11
Geraldton ...	950	19	290	31	Norseman ...	229	21	116	12
Greenough ...	654	16	309	27	Boorabbin ...	333	17	110	14
Dongarra ...	732	16	378	25	Southern Cross	346	18	98	19
Minginew ...	763	14	329	13					
Carnamah ...	553	15	256	21	S.W. COASTAL :				
Dandarragan ...	601	12	465	11	Gingin ...	874	15	507	20
Moora ...	534	12	386	11	Kalamunda ...	1,022	17	...	...
Walebing ...	592	16	324	25	Guildford ...	1,074	17	561	29
New Norcia ...	575	17	355	26	Perth Gardens...	907	18	557	33
					" Observatory	993	17	565	12
MURCHISON FIELDS :					Fremantle ...	579	19	476	31
Peak Hill ...	69	7	79	11	Rottneat ...	609	16	449	27
Abbotts ...	163	8	76	10	Rockingham ...	1,093	17	521	11
Gabanimtha ...	196	10	78	9	Jarrahdale ...	900	16	751	26
Nannine ...	181	10	54	14	Mandurah ...	795	17	565	14
Cue ...	256	11	79	14	Pinjarrah ...	833	15	653	30
Day Dawn ...	223	12	72	13	Collie ...	555	16	499	9
Lake Austin ...	351	12	103	11	Brunswick Junct.	655	19	...	...
Lennonville ...	308	12	110	8	Bunbury ...	807	16	544	32
Mt. Magnet ...	403	11	85	14					
Yalgoo ...	441	13	90	12					
Murgoo ...	350	13	78	20					

*100 points=lin.

RAINFALL—continued.

STATIONS.	*Total for August, 1909, in points.	No. of wet days.	Average for August.	No. of Years Records.	STATIONS.	*Total for August, 1909, in points.	No. of wet days.	Average for August.	No. of Years Records.
S.W. COASTAL—continued.					S.W. INLAND—continued.				
Donnybrook ...	590	20	503	8	Arthur ...	549	17	280	18
Busselton ...	525	18	446	28	Wagin ...	464	14	237	18
Cape Naturaliste	614	24	425	5	Katanning ..	467	20	230	17
Karridale ...	614	21	649	59	Broomehill ..	449	20	244	18
Cape Leeuwin ...	615	22	500	12	Kojonup... ..	415	14	327	24
					Greenbushes ..	700	22	552	16
S.W. INLAND:					Bridgetown ..	641	23	488	21
Kellerberrin ...	312	16	152	16					
Meckering ...	507	14	214	11	SOUTH COASTAL:				
Newcastle ...	704	15	360	29	Mt. Barker ...	664	21	357	22
Northam ...	533	15	259	28	Albany ...	707	23	519	32
York ...	581	15	293	32	Breaksea ...	642	25	414	19
Beverley ...	712	17	236	26	Bremer Bay ...	551	22	292	24
Brookton ...	586	12	...	...	Hopetoun ...	444	17	204	7
Wandering ...	561	16	360	20	Ravensthorpe ..	537	17	123	7
Pingelly ...	607	15	242	18	Esperance ...	521	17	391	25
Narrogin ...	558	15	282	17	Israelite Bay ...	367	21	179	24
Marradong ...	654	15	443	11	Balladonia ...	171	13	89	18
Williams ...	558	18	349	24	Eyre ...	349	14	123	24

*100 points=1in.

REMARKS ON THE RAINFALL FOR AUGUST, 1909.

The aggregate precipitation for the month discloses, in a majority of cases, a large increase over the normal throughout the Gascoyne, Murchison, and Coolgardie Goldfields and the South-West, except the extreme South-West corner and along the South coast. An excess is also shown at a few scattered places, namely, Cossack, Marble Bar, and the district between Hall's Creek and Turkey Creek. Elsewhere a slight deficiency is shown.

In the Gascoyne and Murchison Fields the excess ranges from 49 points to 351, and over the Coolgardie Fields from 53 to 248 points, while in the South-West, leaving out the country surrounding Collie, Donnybrook, Busselton, and Kojonup where the excess is only from 56 to 93 points, it ranges from 136 points at Dandarragan to 778 at Mullewa.

Only a few showers fell in inland portions of the East Kimberley, while stations in the North-West division only reported light to moderate rain on the 4th and 5th.

In the Gascoyne and Murchison Fields inclement conditions reigned during the first ten days, heavy falls being measured on the 3rd. From the 2nd to the 5th the rain was general, but from the latter date to the 10th it was mostly light and of a scattered character. No rain fell for two days, but between the 13th and the 19th further light falls were experienced, general on the 18th and 19th. Dry conditions then set in and continued till the end of the month, with the exception of a light shower at Sharks Bay on the 26th.

No rain fell on the Coolgardie Fields during the opening day of the month, but from the 2nd to the 11th wet unsettled conditions were in evidence,

general falls being reported on the 3rd, 4th, 5th, and 6th, and heavy on the 3rd over the North Coolgardie Fields. A period of dry weather then ensued, lasting till the 16th, when another period of wet weather set in and continued till the 19th, while the following nine days saw showery conditions throughout the Coolgardie Fields; extending on the 25th to scattered stations on the North Coolgardie Fields. In the South-West and South inclement weather was maintained during the first four days, some very heavy falls being registered at stations to the North of Carnamah on the 2nd and 3rd, Geraldton recording 330 points in 30 minutes. A slight break occurred on the 5th, only a few light showers being recorded here and there in the South-West, but it was fairly general along the South coast. On the following day, however, a very pronounced disturbance of the regular winter type approached the Leeuwin and during the next five days moderate to heavy rain was experienced throughout with heavy coastal weather. The heaviest falls were measured on the 8th and 9th, the majority of stations in the South-West registering an inch and over on the 9th and many recording an inch on the 8th. Light showers continued along the Southern coastline on the 11th and in the extreme South-East during the two following days, but in the South-West bright, pleasant weather ruled from the 12th to the 14th and then another period of wet weather set in and continued till the 22nd. Moderate to heavy general falls were measured on the 16th, 17th, and 18th, whilst during the next three days the rain was mostly confined to the South-West coastal districts and along the South coast. On the 22nd, however, it was almost general southwards from Walebing. Only a few isolated showers fell on the 23rd and 24th, but between the 25th and 29th rain was practically general along the South coast, one or two stations on the 26th registering an inch for the 24 hours. In the South-West it was of a scattered nature, except on the 28th, when nearly every station reported light to moderate falls. Scattered showers then prevailed in the extreme South-West corner and along the South coast till the end of the month.

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Albany Agricultural and Horticultural Society	W. H. Richardson, Albany
Beverley Agricultural Society	G. Townley, Beverley
Bridgetown Agricultural Society	T. Rossiter
Bunbury Agricultural Society	W. S. Hales
Busselton Agricultural Society	A. R. Bovell
Cunnington Agricultural and Horticultural Society	W. E. Cockram, Canning
Donybrook Agricultural Society	F. H. Layton
Geraldton Agricultural Society	W. Cassel Brown, Geraldton
Great Southern Pastoral and Agricultural Districts' Society	W. W. Brunting, Katanning
Greenough Farmers' Club	J. E. M. Clinch, Greenough
Irwin Districts Agricultural Society	F. Waldeck, "Bonniefield," Dongarra
Jandakot Agricultural Society	F. W. Martin, Post Office, Janda- kot
Jarrahdale and Serpentine Agricultural Society	W. W. Watson, Mundijong
Katanning Agricultural Society	W. W. Bruntton
Kelmscott Agricultural Society	H. Cross, Kelmscott
King River Settlers' Association	R. H. Playne, Albany
Kojonup Agricultural Society	A. J. McGrath, Kojonup
Lower Blackwood Farmers' and Graziers' Association	P. D. E. de Néve, Lower Black- wood
Moora Agricultural Society	P. W. Glacken
Mt. Barker Rural Association	A. R. Parker, Mount Barker
Murray Agricultural Society	J. D. Paterson, Pinjarra
Narrogin-Williams Agricultural Society	G. G. Lavater, Narrogin
Nelson Agricultural Society	T. Rossiter, Bridgetown
Northam Agricultural Society	F. B. Timperley, Northam
Pingelly-Mourambine Agricultural Society	A. A. Kent, Pingelly
Royal Agricultural Society of W.A.	Theo. R. Lowe, Perth
Southern Districts Agricultural Society	Percy Smith Bignell, Busselton
South-West Central Agricultural and Horticultural Society	F. H. Layton, Donybrook
Swan Agricultural and Horticultural Society	H. A. Devenish, Guildford
Toodyay Agricultural Society	A. James, Newcastle
Wagin-Arthur Districts Agricultural, Horticultural, and Industrial Society	W. E. Clarke, Wagin
Wellington Agricultural and Pastoral Association	W. S. Hales, Bunbury
Williams Agricultural Society	H. V. Carne, Williams
York Agricultural Society	J. E. Spark, York

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Albany and King River Settlers' Association	R. H. Playne, King River
Armadale Progress Association	John Gould, Armadale
Balingup Farmers' Association	P. V. Mauger, Balingup
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Boyanup Farmers' and Progress Association	R. A. Payne, Boyanup
Boyp Brook Agricultural and Vigilance Committee	Wm. Vincent, Boyp Brook
Brunswick Farmers' Association	Arthur E. Clifton, Brunswick
Bullsbrook Progress Association	D. Strachan, Bullsbrook.
Capel Farmers' Association	C. J. Rooney, Capel.
Central Fruitgrowers' Association	A. Barratt, Perth
Coogee-Spearwood Agricultural and Horticultural Society	R. Barton, Hamilton-road, Spear- wood
Cookernup Farmers' Progress Association	A. L. Cunlold, Cookernup
Dangin-South Caroling Progress Association	W. G. Haines, Caroling, East Beverley.
Darling Range Horticultural Society	A. C. Armstrong, Sawyers' Valley
Deepdale Farmers' and Fruitgrowers' Association	Chas. M. Lukin, Newcastle
Denmark Settlers' Association	H. V. Buckley, Denmark
Drakesbrook Agricultural Association	H. McNeill, Drakesbrook
Esperance Agricultural, Horticultural, and Floricultural Society	R. H. Dean, Esperance
Fremantle Horticultural Society	Hugh C. Anderson, Hon. Sec., c/o Union Stores, Ltd., Fremantle
Goldfields Dog, Poultry, and Horticultural Society	J. A. McNeill, Coolgardie
Goldfields Agricultural Society	Monmouth Smith, Kalgoorlie
Goomalling Farmers' Association	W. Gray, Goomalling, via Northam
Greenhills Farmers' Club	James McManus, Irishtown
Greenough Farmers' Association	J. McCartney, Walkaway
Harvey Farmers' Club	W. E. Ash, Hon. Sec., Harvey
Harvey Citrus Society	Kenneth Gibson, Harvey
Horticultural Society of W.A.	L. S. Dean, c/o Messrs. Sandover and Co., Perth
Jennapullen Agricultural Society	A. C. Morrell, Jennapullen
Jurakine Agricultural Society	W. Hayward, Jurakine
Kalamunnda Horticultural Society	A. Sanderson, Kalamunnda
Lake Pinjar Agricultural Association	H. Hartman, Pinjar
Mandurah Progress and Agricultural Association	C. Tuckey, Mandurah
Marbellup and District Settlers' Association	F. Mullineaux, Evergreen Valley Marbellup, G.S.E.
Margaret River Progress Association	L. E. de Mole, Margaret River.

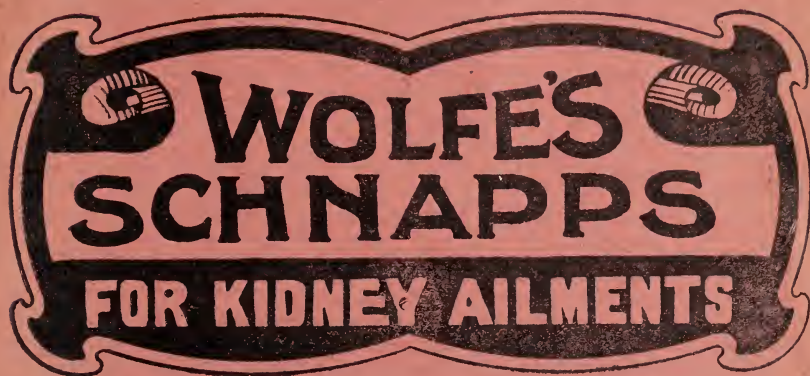
SOCIETY.	SECRETARY.
Monwongie Progress Association	E. A. Batt, Monwongie, Popan- yinning
Moonyoonooka Farmers' Association	W. H. Williams, Moonyoonooka
Murray Horticultural Society	Miss M. Alderson, Pinjarra
Newcastle Branch Bureau	W. A. Demasson, Newcastle
Newtown Progress Association	T. A. Thurkle, Woodlands, Vasse
North Greenough Farmers' Association	W. F. Stansfield, Boonetal
North Lake Progress Association	A. R. F. Johnston, c/o W. Lyons, South Road, Fremantle
Parkerville Agricultural Society	S. Ramsay, Parkerville
Plantagenet Beekeepers' Association	Vacant.
Popanyinning Progressive League	F. R. Bayliss, Popanyinning Pool, G.S. Railway
Preston Progress Association	T. B. Jones, Preston
Quindalup Progress Association	W. E. Carter, Busselton
Spearwood Progressive Association	R. Barton, Hamilton-road, Spear- wood, Fremantle
Talbot Progress Association	O. Ryan, York
Thomson's Brook Progress Association	J. W. Padman, Thomson's Brook.
Toodyay Vine and Fruitgrowers' Association	W. A. Demasson, Newcastle.
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Victoria Plains Farmers' Association	J. Halligan, Summer Hill, Victoria Plains
Waigerup Agricultural Hall Association	W. J. Eastcott, Waigerup
Wandering District Agricultural Society	W. B. Smithson, Wandering
Wanneroo Farmers' and Gardeners' Association	F. J. Hollins, Wanneroo
Waterloo Farmers' Vine and Fruitgrowers' Association	T. W. Harris, Waterloo
West Swan Producers' Association	J. H. Stone, Guildford
Wongamine Farmers' Club	G. W. B. Smith, Wongamine
Wonnerup Progress Association	P. S. Brockman, "Reinscourt," Busselton
Wooroloo Progress League	T. H. Ibery, Wooroloo
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West Coolup Progress Association	Stanley Caris, Pinjarra
West Pingelly Progress Association	J. J. Parker, Neta Vale, Pingelly.
Yorkrakine Progress Association	Walter R. E. Powell, Yorkrakine.

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Claremont	C. H. Evans, Claremont
Collie	A. E. Smith, Collie
Coolgardie	J. S. Stewart, Council Office, Coolgardie
Fremantle	A. J. Parkin, Queen Street, Fremantle
Gingin	Chas. W. Johnson, Gingin
Kalgoorlie	H. R. Bristow, Kalgoorlie
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West Australian	Jas. Bolt, Hay Street.
West Australian Canary, Pigeon, and Bantam Club	Harry Barnett, 159 Barrack Street, City.
West Australian Minorca Club	E. J. Ford, Rockton Road, Claremont.

DATES OF MEETING OF SOCIETIES.

- Albany and District Settlers' Association—
At Torbay Junction.
- Armadale Progress Association—
Last Tuesday in each month, at 8 p.m.
- Boyanup Farmers' and Progress Association—
First Saturday in each month.
- Brunswick Farmers' Association—
Wednesday preceding full moon, at 8 p.m., at the Agricultural Hall.
- Capel Farmers' Association—
Last Saturday on or before the full moon, at 8 o'clock.
- Greenough Farmers' Club—
January, April, July (annual), and October.
- Jarrahdale and Serpentine Agricultural Society—
Meet the Saturday preceding the full moon, at 8 o'clock p.m., at the Agricultural Hall,
Mundijong.
- ROYAL AGRICULTURAL SOCIETY OF W.A.—
Second Tuesday in each month.
- Upper Chapman Farmers' and Fruitgrowers' Association—
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- W. A. Beekeepers' Association—
Second Wednesday in each month, Museum, Department of Agriculture, 7-30 p.m.
- Wanneroo Farmers' and Gardeners' Association—
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- West Coolup Farmers' Association—
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At no time shall the advances to any one person (or number of persons if borrowing conjointly) exceed the sum of £500, and no sum exceeding £100 shall be advanced to any one person for the purchase of breeding stock. In applications for this purpose, the condition and capability of the security to successfully carry stock is of paramount importance.

Persons under 21 years of age, being unable to legally mortgage, are debarred from borrowing from the Bank.

Every application for an advance must be made on the Bank's forms, and shall contain all particulars required thereon.

Applications may be for sums of £25 or any multiple thereof, not exceeding £500. Each application must be accompanied by a valuation fee of 1 per cent. of the amount applied for. No refund of fee is allowed after an inspection of the security has been made.

Mortgages are prepared free of charge, but borrowers are required to pay the statutory charges in connection with their registration. These are:—

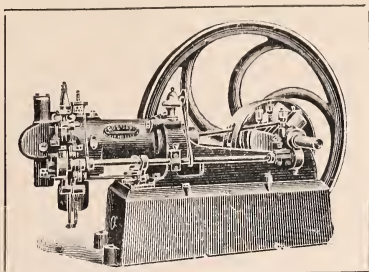
- (a.) Stamp Duty of 2s. 6d. for each £50 of the amount of mortgage up to £300; and
- (b.) A registration fee of 5s. for each Conditional Purchase or Homestead Farm Block mortgaged.

The Leases or Occupation Certificate, as the case may be, together with the above fees, must be in the possession of the Bank before a mortgage can be prepared.

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